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HEADACHES:

THEIR

NATURE, CAUSES AND TREATMENT.

BY

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BRAIN OF MAN.

1, 2, 3, frontal convolutions; 4, 5, 6, A and B, parietal convolutions; 7, 8, 9, temporo-sphenoidal convolutions; 10, 11, 12, occipital convolutions. A is the supra-marginal lobule; B is the postero-parietal lobule; and β on the bridging or annectent convolutions; R, fissure of Rolando; S, parieto-occipital fissure.

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PREFACE TO THE FIRST EDITION.

In the present day there are so many investigators in every field of study, that it would be impossible to keep pace with any branch of it, if worked out satisfactorily and to its full extent, unless we refreshed our ideas from different increasing springs of knowledge, and thought the subject over again and again from every point of view. This applies, perhaps, more to medicine than to any other subject; for as we inquire into the origin of human maladies, new features continually present themselves, and new mysteries to be solved continually arise.

The views I have here advanced are the results of notes and observations carefully recorded by me, and extending over a period of many years. In most of the cases which have formed the groundwork of the present task, I have had ample opportunities of watching their course and progress. I have, moreover, rather relied on the investigation of facts, as presented by the record of cases, than trusted to plausible theories. It is on actual facts I have attempted to lay the basis of the treatment and management which appear to me best

adapted to meet the varieties and peculiarities of headache. In all search for truth facts must be recognized, however they appear to contradict an apparently secure and well-established principle. To grasp the general conception and meaning of any subject in which the operations of nature are concerned, and from which a reasonable solution is expected, we must establish the conclusions which lead up to principles on the sure foundation of fact, and not, like the French philosopher, think it so much the worse for the facts if they are not included in our theory. If theory is unsupported by fact, our views and opinions entail disastrous consequences, and any line of argument we may have adopted is rendered utterly futile.

I may here remark that several works have recently issued from the medical press on the subject of headache, teeming with interest both to the patient and practitioner. Headache has always been carefully studied in its clinical aspect, but the recent advance of physiological knowledge, as derived from experiment, has given a new and powerful stimulus to the study of the diseases of the nervous system. Not only has it furnished a stimulus, but it has tended much to clear up our impressions as to the pathology of diseased conditions. The recognition of perivascular spaces has enabled us to comprehend how the blood supply of the brain may vary from time to time. These modifications in its physical consistency do not impair its functional activity, but promote the growth

and reconstruction of the nervous system, which is undergoing incessant change and regeneration. By means of these spaces the vessels dilate without compressing the brain, and when they again contract the soft structures of the brain are sustained by the effusion of lymph without any serious consequences ensuing.

The researches of physiologists heretofore had stopped short at the cerebrum, and only comprised the deep-seated ganglia at its base; but the recent investigations of Fritsch and Hitzig, and still more of our countryman Ferrier, have demonstrated that the different portions of each convolution possess special functions. Some are motor-centres, and others are centres of sensation. The vast additions which have been recently made to our previous knowledge by Dr. Ferrier's experimental researches justify us in drawing certain definite conclusions, not only as confirmatory of the functions of the deeper structures of the brain, but of the convolutions themselves. By applying electricity in the form of local *faradization* to the cortical substance of the brain, he could produce at will an intense amount of *hyperæmia*, increasing the quantity of blood and the size of the vessels; and, in the case of rabbits, he found that the repeated application of the electrodes converted the cerebral substance into a condition resembling *fungus hæmatodes*. By irritating the different portions of the hemispheres in some of the lower animals, he could excite partial or general convulsions, and these were invariably preceded

by a hyperæmic state of the cortical tissue. These experiments bear most strikingly on that state of nerve-tension, which Dr. Liveing describes as leading to "nerve-storms," when an explosive discharge takes place from the ganglionic centres, reducing the tension and irritability of the parts involved, while lessening the hyperæmia on which they depend. A recognition of these facts is essential to a rightful comprehension of headache. They help in no small degree to explain the intimate relation of the nerve force to the blood supply.

My earnest endeavor throughout the book has been to make it practically useful. I have adopted the division of headaches into several varieties, which may possibly seem to some readers to involve too great a refinement; but on full consideration, I think they will find it neither unnecessary nor frivolous. The diagnostic features which distinguish hyperæmia in some of its forms from congestion and plethora, are somewhat difficult to lay down, but we are most likely right in assuming that there is a physiological difference. As regards the origin of active hyperæmia, if we see the subject dimly, we are sure that its active form does not always depend upon the same pathological conditions. The cerebral tissue is overexcited and stimulated by increased cardiac action in the one case of hyperæmia; and in the other, the hyperæmia is the consequence of relaxation of the vessels, and vaso-motor paresis. All the states depend upon an enlargement of the capillaries, either with increased activity

of the general circulation, or with obstructed or retarded motion of the blood through them. Congestion, in the strict sense of the word, would seem to be the excessive attraction of blood by the tissues, rather than either the active or the passive form of hyperæmia. A hyperæmic state of the brain, when long kept up, leaves the organ weaker, and disposes it to an asthenic form of congestion. I have described passive hyperæmia and passive congestion under separate headings, and although they are in many points identical, I wish to imply by the latter a decrease in the circulating power of longer standing, a more relaxed condition of the vessels, and a greater tendency to serous exudation.

I must here express my indebtedness to Dr. Herbert Major, the Superintendent of the West Riding Asylum, for permission to copy a plate of his, which gives the microscopic appearances of the cerebral cells of the convolutions. It is on these cells that cerebral activity depends. I also have to thank Dr. Lauder Brunton, F.R.S., for a copy of a woodcut, which renders very intelligible the association of headache with disturbance in the abdominal viscera.

10 Manchester Square,
March, 1877.

I have added a few pages to this book, which I trust may be as favorably received by the profession as the two previous editions.

December, 1879.

DAY

ON

HEADACHES.

GENERAL INTRODUCTION.

Preliminary Remarks on the Preponderance of Diseases of the Nervous System at the Present Day—Source of the Pain in Headache, and its Common Dependence on the State of the Brain and Nerves—Definition of the Term—Difficulties in adapting Suitable Definitions to embrace all the Varieties of Headache—State of the Brain in some Cases of Apoplexy and Simple Concussion—Importance of Rest in the Treatment of Headaches at all Periods of Life, and more particularly in the Young, when the Growth of Mind and Body is in Active Progress.

MANY affections of the brain rather manifest themselves in impaired functional activity than in actual pain and suffering. Almost any change in the circulating fluid, whether it be degraded from the absorption of noxious ingredients, or impoverished by a diminution of its normal constituents, will give rise to irritation and that altered sensation which indicates a disturbance in the sensorium.

The most typical diseases of the present day are those which affect the nervous system, and we need not travel

far to ascertain the causes which produce them. The strain to which the nervous system is subjected through the requirements of modern times, renders it far more liable to disease than formerly, and men break down prematurely from overwork and the want of rest. Every branch of study is now pushed forward with a vigor unknown to our ancestors, and the young child is expected to grapple with abstruse questions, which a few years ago were only intended for the advanced scholar and those who made philosophy their peculiar study. The microscope with its revelations, the electric telegraph which brings us in immediate contact with the enterprise and movements of other countries, are both powerful factors in stimulating the brain of man to unusual activity; the conflicting theories and theological controversies that have sprung out of the discoveries which geological science has called forth, and the generally increased pace at which we live, have all tended to excite and exhaust the brain. The tide, having once set in, rolls with resistless force, and the question may be reasonably asked, Where will the waves of destruction stop? The diseases of the nervous system threaten to be the diseases of the future, as they are of the present day, in spite of any restraint which men can put upon themselves. However desirous they may be to prevent it, they are helplessly and irresistibly drawn into the contest, to struggle on and survive, or to fall early in the combat.*

* This matter has not escaped the attention of observant laymen. "The politician, the professional man, the merchant, the speculator—all must experience that strain of special faculties in the direction towards special objects, out of which comes nervous exhaustion, with

Before civilization had arrived at its present high state, the overwrought brain was confined to men of letters and laborious students in the solitary contemplation of human knowledge. Nervous exhaustion was not the common disorder we now find it, and physicians were nearly silent on the causes which produced it. In whatever direction a man now turns his attention, he is sure to see competitors who are striving for the same prizes. In trade, in commerce, in literature, and in art, it is ever the same—no man has the field to himself. But the professional man may perhaps be singled out as the chief example of overstrained exertion. He must strain every faculty toward the special object he is studying, and dare not leave it till he has worked it out to the minutest detail. If he does quit the field, failing to discover some new stratum, he is followed by another, who digs up the hidden treasure which gives a name or builds up a future. His thoughts are ever active and at work, and the brain will not rest, unless other occupations are found, and a new set of organs are called into play. In the physical disorders of man a certain set of muscles require rest, whilst another set are required to perform their lost functions, and disease imitates this in the activity of certain organs, to allow the worn-out ones to recruit themselves. Rest from thought would obviate much of the fatigue

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the maladies consequent on overstimulus and prolonged fatigue. Horace is a sound pathologist, when he tells us that after Prometheus had stolen fire from heaven, a cohort of fevers, unknown before, encamped themselves on earth. In our audacious age we are always stealing new fire, and swelling the cohort of fevers with new recruits." —*Miscellaneous Prose Works*, by Edward Bulwer, Lord Lytton, 1868, vol. iii, p. 108.

and exhaustion of the brain, if it could be adequately measured and carried out; but the circumstances of life generally do not enable a man to avail himself of that change of thought and occupation which would be a safeguard against the terrible evils he is fostering.

If there be any truth in this argument, it is not surprising that the complex and delicate structure of the brain, and nerves, should fail under the continued strain and this struggle for existence in the battle of life. Every emotion, every perception, and every action operate through this vast machinery, and invest it with an importance which did not belong to it forty years ago, when the atmosphere of thought was more serene and tranquil. What wonder, then, if the nervous system should suddenly or prematurely give way, if it has to bear a load every day, which at one time only emergency or accident put upon it! Added to the altered circumstances of modern times, care and anxiety bring their oppressive burden to bear in greater force, increasing the susceptibility of the nervous framework, and robbing it of much of its power of resistance.

Then, too, the luxuries of a larger portion of mankind have increased, and in a corresponding ratio; and nervous prostration is the penalty we pay for our indulgence. The sensual pleasures of life, which make such inroads on our strength and powers of endurance, are alarming to contemplate, in the varied forms of suffering which they produce in return for a passing gratification or an idle enjoyment. Sustained and steady work are not the prevalent features of our present life, but laborious strain and tension, followed by brief and broken periods of repose.

A continuity of causes oftentimes produces the same results; and we see this exemplified in headache, as well as in many other diseases. There is first the influence of excitement, and overstimulation to the brain, and then the influence of exhaustion. When both act in concert, how rapid is the downfall! I hold with unshaken fidelity to the conviction of a nerve preponderance in these headaches, which eclipses every other. We cannot set aside its attractive power to implicate the vascular tissues, and to change and modify the signs and symptoms of disease in every texture of which the body is made up; nor the rival sway it exerts in corrupting the machinery of the whole body, and accomplishing the destruction of the vital parts.

In attempting to classify headaches into groups and varieties, some speculations are necessarily indulged in to establish conclusions and to support principles; but I have endeavored to place fairly before the reader the chief aspects of the question, and to weigh carefully in the scale of calculation every collateral sign of investigation, that fallacy may be reduced to a minimum, if not wholly got rid of, and that conviction of some sort may be gained.

It has been my desire to consider this matter in a broad light. Devotion to any view or idea gives it an ascendency in the author's mind; and by attaching undue importance to it, he may be led into error. We are all, in fact, more or less disposed to incline to one side or the other, and so to entertain a prejudiced view of things, which has a cramping effect in the pursuit of a study like practical medicine. The mind is to be pitied that extends the range of inquiry no further than the sphere of its own

special study, for in this way knowledge is improperly applied. "Men's thoughts," says Lord Bacon, "are much according to their inclination, and they speak as they have learned."

In the disorders we are about to consider we shall deal chiefly with those that are functional, for curable headaches cannot be strictly classified with morbid states of the brain. And yet the difficulty is as real as it is hypothetical. Molecular changes may take place in the cerebral cells, and produce symptoms allied to organic lesions, having no show of difference except in their transient duration.

The subject of headache is of manifest importance, because it claims so many sufferers and is surrounded by so many difficulties—the pathology is obscure, the diagnosis perplexing, the remedies uncertain. Headache is a disorder of the utmost frequency, and yet there is none which more taxes the experience and scientific knowledge of the physician, or requires closer observation in elucidating its nature and removing its obscurity.

The habitual sufferer from headache allows no other pain to compete with it. Whether he is prostrated by its agony, or has recovered from a recent attack, he is persistent in his statement, that a continuance of the pain would rob him of all pleasure in existence, and make him sigh for escape by death. The aching cerebral mass shut up in its bony cavity only reveals its morbid condition by the statements of the sufferer; in its functional derangement it does not indicate by any reliable signs whether this or that part is at fault, as in disorders of the abdominal or thoracic organs; the source of the suffering cannot be fixed upon and removed, as a decaying

tooth, or a calculus in the bladder; but it goes on, and we are too often left in doubt whether the suffering has originated in the brain itself, or in some other organ of the body from reflex irritation and sympathy. Are the brain and its vessels deficient in the supply of blood? Is the circulation contributing its due supply of arterial nourishment? Or is it in excess, and are its vessels overloaded? These perplexing questions constantly present themselves for settlement. The same symptoms arise when very opposite conditions prevail. The delirium of scarlet fever is not the delirium of typhus, although they may present very similar features. There is the sleeplessness of anæmia and of congestion; and there is the coma of bloodlessness as well as of hyperæmia. How can such dangerous conditions as these be treated with any chance of success if we have erred in the interpretation of their pathological associations, or ascribed the phenomena to a state of the brain and general system which does not exist?

Bearing in mind, then, the intricacy of the subject, and the ever-changing circumstances that surround us, we approach the discussion of a disorder which modern habits of life encourage and develop, and threaten to increase tenfold. Our system of railway travelling has no small share in producing that aching of nerves within the brain, which robs existence of enjoyment, and interrupts the serenity of social life; and which too often drives the pitiable sufferer to the brink of despair, when he finds no relief in the legitimate resources of our art. In clinging to any nostrum within his reach, he increases the evil which is to render his live heavy and wearisome, and to baffle his energies and labors to the end.

In no class of diseases do we observe better examples of *sympathetic pain* than in headache. Pain originating in one part may be transferred to another and weaker part, or to one ready to take on the morbid impression of pain. This communication is regulated to a great extent by the irritability or nervous susceptibility of the patient.

The mere idea of pain is enough to bring on actual pain in some persons; and the mind can so vivify or exaggerate it, as to give it a reality through sensation. The sympathetic pain of the shoulder from hepatic disease, the pain in the knee from hip-joint disease, and the pain of the genito-crural nerve from calculus in the kidney, or the severe pain down the thigh after the removal of ovarian tumors, are all instances of reflected pain. The transference of pain beyond the seat of its production is an interesting fact in physiology, and where the impressions can be traced along a set of nerves the explanation is forthcoming. It is this communication which refers painful sensations to a distant part from which the irritation has sprung, till it finally appears to have its origin in that part, whilst the original seat of mischief is lost sight of altogether.

If, then, the cause of some headaches is traceable to a morbid sensation conveyed along a nerve by sympathetic action, it is explanatory of some painful feelings in the head and face, through the contact of certain articles of food, and intense cold on the terminal nerves of the stomach. Any sudden shock of grief may occasion gastric pain, and it certainly awakens fearful headache in some persons. "Putting aside," says Dr. Symonds, "for the present, any reference to the patient's feelings, what do we learn from anatomical considerations

as to the probable source of pain within the cranium when the person is the subject of headache? It does not appear to be in the nervous matter, whether vesicular or tubular, of the cerebral hemispheres, or of the cerebellum. No evidence of feeling has been obtained by vivisectors till they approached the sensory ganglia—the thalami optici and corpora quadrigemina. But these are the centres of sensation to all parts of the body as well as to the head. All analogy must further look for the nerves as the source of pain (though some writers are hardy enough to doubt the necessity of nervous matter as instrumental in sensation). And what are the nerves? Numerous as are the nerves which come out of the cranium, there are on a superficial view very few that go into it. A branch of the suboccipital accompanies the vetebral artery, but a large majority of the other nerves, destined for intracranial purposes, are derived from the sympathetic. These, then, are the nerves which are of the chief interest to our present inquiry. Nerves of this class accompany bloodvessels, and when we observe the large amount of these vessels, the brain and its membranes being more liberally supplied with blood than any other organ (the quantity being computed as one-fifth of the blood of the whole body), we might, without searching further, feel convinced that there must be a correspondent supply of ganglionic nerves; but the minute examination of modern anatomists has tracked them in great abundance."*

By the term headache, we mean to signify pain in the

* Gulstonian Lectures on Headache, Medical Times and Gazette, 1858.

head, accompanied with intolerance of light and sound, and incapability of mental exertion ; a state, from whatever cause arising, in which the brain is temporarily prostrated and disturbed, in proportion to the cause and intensity of the suffering. Thus, many headaches depend primarily on a disturbance in the cerebral structure, on a loss of balance in the relations of the nervous force and vascular supply, or on some intricate phenomena of the mind, which increase the sensibility of the brain, and disturb its functions.* Then follows sympathetic disturbance in the digestive organs, which, reacting on the brain, increases all the symptoms for a time; but soon, from the process having advanced further, or from some change ensuing in the current of the circulation, the morbid sensibility of the brain abates, and the headache vanishes.

* "The headache, a very frequent symptom in all cerebral diseases, is very difficult to explain; we do not even know if it is of central origin (that is, if it originates in the parts of the brain where irritation causes symptoms of pain after the insensible greater hemispheres have been removed), or whether, as I think is more probable, it depends on irritation of the filaments of the trigeminus going to the dura mater. The great sensitiveness to impressions on the senses depends on the increase of excitability, caused by the cerebral hyperæmia, on the hyperæsthesia of those portions of the brain through which peripheral irritations are perceived. The patients do not exactly feel, see, and hear more sharply than ordinarily, but they are annoyed by irritations far weaker than such as usually annoy them. Light troubles them; a slight sound or an insignificant irritation of the nerves of touch excites disagreeable feelings. Morbid excitation (which must not be identified with increased excitability) of the same central parts causes the dazzling before the eyes, seeing sparks, roaring and buzzing in the ears, the sensation of formication, or of undefined pain, which are not induced by peripheral irritation."—*Niemeyer's Practical Medicine*, vol. ii, page 159.

For some days before the development of a nervous headache, patients will admit, on close examination, that they felt easily fatigued without any real cause; that they awoke unrefreshed in the morning, with a feeling of weight over the eyes, which passed away after breakfast; that before the close of the day they were unusually tired, and felt on going to bed some flatulence and indigestion, with dryness of the mouth, and an extraordinary degree of depression and weariness. During the night, or the following morning, the nervous headache is developed, and after that the altered sensibility of the brain and the arrest in the powers of digestion proceed together. Symptoms, therefore, which appear as primarily indicative of disorder in the stomach and intestines, are really often secondary, or sympathetic affections, resulting from the pre-existent disorder within the brain; and when we come to consider the varieties of headache, we shall see how this disturbance is effected.

The conditions which produce some forms of headache are wrapped in mystery, and we are carried into the realms of speculation to explain them. The cranium of the adult is air-tight and unyielding. In a healthy state the brain probably undergoes neither dilation nor compression. Neither the contents of the thorax, nor the abdomen, sustain the same amount of pressure for one second; the elasticity of their walls through the movements of respiration keeps them in perpetual activity, and the blood-pressure is continually changing; but the case of the cranium is altogether different. Where a tumor is present, or lymph or blood is effused into the brain, there is an alteration in pressure, and the brain substance is displaced by the encroachment of disease;

but if pressure arises gradually, the brain sometimes adapts itself to the changes which are going on. In some cases of apoplexy the effusion has been so rapid and extensive, that it has pressed upon the brain, so as to cause symptoms of rapid compression and death. It should, however, be borne in mind that the phenomena of apoplexy have ensued where nothing but a disproportionate amount of blood has been seen in the vessels and sinuses after death, without any rupture; but then the vascular connection that exists between the vessels of the brain and those that ramify over the face and scalp has a tendency to relieve the sudden determination within the head. The balance of the cerebral circulation is interrupted when the arteries are nearly empty, for then the veins are full, and oppression is the consequence. If arterial tension is increased, and the vessels are full, a state of exaltation and excitement then ensues, tending to delirium or mania.

There is no exact evidence of the actual change that takes place in the cerebral mass, when a physical disturbance of the brain and nervous centres is caused by simple concussion. A mere confusion of ideas, or a temporary lull in the mental process, as though the sufferer had just awoke from sleep, and had not yet realized the external world around him, are all the manifestations of the mischief. I apprehend that in these slight cases of shock, when recovery is early and permanemt, there is no structural or molecular lesion; but when headache and congestion of the cerebral vessels creep on after a time, then we may calculate with almost absolute certainty that the force of the circulation through the bruised organ is

disturbed, being excessive in some parts, and scanty in others.

If the delicate structure of the brain is susceptible of molecular disturbance from injury, it is a rational inference to suppose that the same may occur from functional disorder and perverted nutrition, when they have been of long standing. A structural lesion at the base of the brain is possible where the vascular supply is the greatest, and the minute filaments of the pneumogastric nerve are abundant, as they spring from the medulla oblongata. Now, in concussion of the brain the enlightened surgeon, in his treatment, relies more on rest and the exclusion of light and sound, than on any other method of cure. He knows that any plan which does not include these instructions is futile to effect recovery, and to afford the brain a chance of regaining its equilibrium. If it is not allowed a long season of repose, and strain and exertion are put upon it at a time when the utmost quietude is demanded, then softening, inflammation, and gradual degeneration are established.

The brain cannot stand still like a monument, and maintain its integrity. If there is no repair, then there is degeneration; the morbid condition, instead of subsiding, slowly advances, and the rest, of which sleep is the most perfect form, cannot bring its restorative influence into operation; the nights are disturbed and restless, and dismal dreams announce that the morbid changes are still in progress. Repair proceeds with activity in persons of adult life, when growth has ceased and the bodily framework is stationary; but in children, when the tissues are building up, and the changes are rapid in all the organic functions, recovery is often tedious, defective, and uncer-

tain. In these young patients a shaking of the cerebral mass has laid the foundation of confirmed headache, and subsequently of organic change in the structure of the brain, sometimes leading to exudative products and morbid growths. Repair is one of the most beneficent manifestations of the goodness of the Creator: by the sorrow and pain which nature inflicts for the disobedience of our acts, and the violation of the laws which she has instituted for our observance, she stays the progress of disease and injury, permits the restoration of the wasted tissues, and, by a period of calm repose, evokes that growth and repair which obviates permanent harm, and furnishes the conditions requisite for the restoration of perfect functional activity.

I have adopted the following classification of the varieties of headache:*

Headaches depending on Causes within the Brain—Intracerebral Headaches.

1. The Headache of Cerebral Anæmia.
2. The Headache of Cerebral Hyperæmia.
3. Sympathetic Headache.
4. Dyspeptic or Bilious Headache (known also as Sick Headache).
5. (*a*) Headache from Cerebral Congestion, or Congestive Headache.
   (*b*) Headache from Plethora and Increased Vascular Action.

* This classification differs from that which I have adopted for the headaches of children, because adults are liable to some forms of headache which do not belong to early life.

6. Headache from Exhaustion, or from some Peculiar Change in the Cerebral Tissue—Nervous Headache.*
7. Nervo-hyperæmic Headache.
8. Arthritic or Gouty Headache.
9. Toxæmic Headache.
10. Organic or Structural Headache.
11. Headaches of Advanced Life.

Headaches depending on Causes external to the Brain—Extracerebral.

1. Rheumatic Headache.
2. Headache from Affection of the Periosteum.
3. Neuralgic Headache.

Headaches of Childhood and Early Life.

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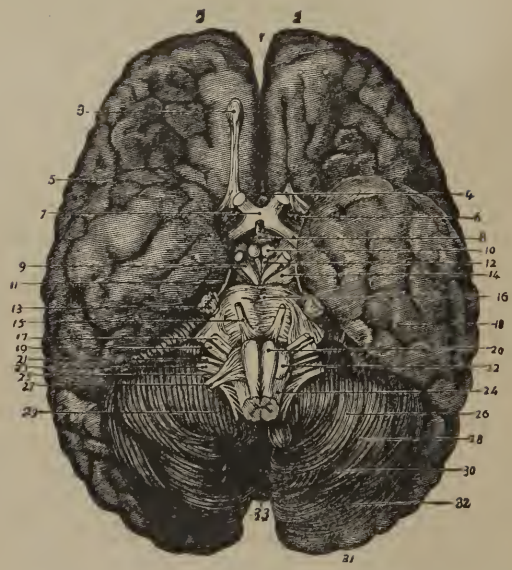
* This variety of headache is also familiarly known as sick headache, and it is so termed by some authors; but the stomach here is only secondarily affected.



THE BASE OF THE BRAIN (FROM HIRSCHFIELD AND LEVEILLE).

1. Longitudinal fissure.
2. Anterior lobes of cerebrum.
3. Olfactory bulb.
4. Lamina cinerea.
5. Fissure of Sylvius.
6. Locus perforatus anticus.
7. Optic commissure.
8. Tuber cinereum and infundibulum.
9. Third nerve.
10. Corpus albicans.
11. Fourth nerve.
12. Locus perforatus posticus.
13. Fifth nerve.
14. Crus cerebri.
15. Sixth nerve.
16. Pons Varolii.
17. Portio dura of seventh.
18. Middle lobe of cerebrum.
19. Portio mollis of seventh.
20. Anterior pyramid.
21. Glosso-pharyngeal nerve.
22. Olivary body.
23. Pneumogastric nerve.
24. Lateral tract.
25. Spinal accessory nerve.
26. Digastric lobe.
27. Hypoglossal nerve.
28. Cerebellum.
29. Amygdala.
30. Slender lobe.
31. Posterior lobe of cerebrum.
32. Posterior inferior lobe.
33. Inferior vermiform process.

CHAPTER I.

THE HEADACHE OF CEREBRAL ANÆMIA.

Physiology of the Cerebral Circulation—Effect of the Cerebro-spinal Fluid in Influencing the Circulation—Perivascular Spaces—Cerebral Anæmia and the Sources of Blood Supply through the Circle of Willis—Relation of Anæmia to Coma—State of the Brain in Sleep—Experiments of Mr. Durham—Physiological Considerations and Conclusions—Symptoms and Diagnosis—Prognosis and Treatment—Physiological Action of Alcohol in Cerebral Anæmia, and its general Effects and Consequences on the Animal Economy.

Cerebral Circulation. — Before we can comprehend fairly what is nervous pain, it behooves us to glance at the peculiarities of the cerebral circulation, and the relationship existing between the nerves and bloodvessels.

In a young child, with its open and elastic fontanels, the amount of blood within the cranium is subject to great variation, because the skull is not quite closed by bone, and the cerebral circulation is obedient to the same laws as regulate the circulation in the rest of the body. In adults, as we have seen, when the ossification of the skull is complete, and the pressure of the atmosphere on the brain no longer exists, the variation in the contents of the cerebral vessels is relatively diminished; but the ventricles and subarachnoidean fluid keep up a tolerably uniform pressure; and where the cerebral substance is diminished in volume from any cause, the fluids and

blood in the vessels prevent that difference from taking place which is so common in the other great cavities of the body.*

The experiments of Dr. Burrows and others prove that the quantity of blood within the cranium is subject to considerable variation, and consequently the pressure exerted on the nervous structure would be considerable also if it were not for lymph arrangements within the encephalon. Dr. Symonds and Mr Mitchell Clarke† conducted some careful experiments which confirmed

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* "There can be no doubt that the most important influence modifying the amount of blood in the brain is the fulness of the ventricles and other cavities of the subarachnoid spaces, and of the lymphatic 'spaces' or sheaths surrounding the cerebral bloodvessels, all of which spaces contain a watery fluid identical with the cerebro-spinal fluid, and all communicate with one another. Their fulness, as said above, holds a precisely converse relation to the amount of blood in the brain, a fact which has been established with regard to the perivascular spaces by exact measurements, it having been found by Golgi that they are larger in all conditions of the brain accompanied by anæmia, and smaller in hyperæmic conditions."—*Jones & Sieveking's Pathological Anatomy*, by Dr. Payne, p. 254.

"In almost all autopsies it may be seen that the amount of blood contained in the vessels and the amount of cerebro-spinal fluid are in inverse proportion; that a distension of the vessels of the meninges is accompanied by a decrease of arachnoid fluid, and conversely that when the vessels are less full, the meshes of the *texture cellulosus subarachnoidealis* contain a greater amount of serum. Only when the brain is atrophied do we find œdema of the membranes with overfilling of the vessels; and only when an effusion of blood, a tumor, or a collection of fluid in the ventricles has contracted the space in the skull, do we find, along with anæmia, dryness of the membranes and disappearance of the sulci between the cerebral convolutions."—*Niemeyer's Practical Medicine*, vol. ii, p. 150.

† Symonds on Headache, Medical Times and Gazette, April 3d, 1858, p. 34.

those of Dr. Burrows, who proved that gravitation affected the quantity of blood in the brain. These gentlemen selected three rabbits—one rabbit was suspended by the hind-legs, another was suspended by the ears and forelegs, and a third was kept in a horizontal position. "The two suspended rabbits were poisoned with prussic acid after about half an hour, their positions having been strictly maintained. The post-mortem examination was made immediately, and with the bodies kept steadily in the same position."

The rabbit suspended by its hind-legs was found to have its eyes congested, and the tissues of the head and neck gorged with blood; but the substance of the spinal cord, and the lumbar and dorsal regions were pallid, the bony tissue of the cranium and the meninges were highly congested, and the puncta vasculosa in the cerebral substance were numerous. The ventricles contained no fluid, and there was none external to the convolutions. The rabbit suspended by the ears and forelegs was found to have its head, neck, and back exsanguine, whilst the lumbar region was full of blood. No serous fluid was found in the ventricles, or between the convolutions. The brain and membranes were as blanched as those of an animal bled to death. In the third rabbit, not suspended, also poisoned by prussic acid, and examined in the horizontal position, there was an equal distribution of blood, and nothing remarkable beyond the absence of cerebro-spinal fluid in the cranial or vertebral cavity.

In a full-grown and strong rabbit, suspended by the ears and forelegs, death occurred in an hour; another strong middle-sized rabbit, hung up by its hind-legs for four hours, recovered itself almost immediately, and began

to feed heartily. We see that the congestion of the brain and membranes produced no ill effects comparatively, whilst the opposite position was quickly fatal.

These experiments corroborate what we know of the rapid congestion of dependent parts after death, and of the tendency to hypostatic congestion of the lungs and brain in fever and other exhausting diseases.

It has been satisfactorily demonstrated by the experiment of Dr. Burrows, A. Durham, Hilton, Kussmaul, and Tenner, and other observers, that there is vascularity of the encephalon during excitement and mental strain; while during sleep and exhaustion the vessels lose their turgidity, and the brain is pale and bloodless. These changes are owing to the presence of the cerebro-spinal fluid, on which Mr. Hilton has laid so much stress. When it is in excess the vascularity is slight, and when it is diminished the turgescence is increased (Rest and Pain). Not only is there a relation between the intra-cranial vascularity and the cerebro-spinal fluid, but there are channels in the substance of the brain, termed by Robin, His, and Obersteiner, "perivascular spaces," along which the bloodvessels travel; and these are invested with a loose sheath of connective tissue, within which is found a watery fluid, regarded by some as lymph.* When the brain is active the vessels dilate, and the fluid is absorbed, without causing any compression of the nervous structure; but when this activity has subsided the vessels undergo contraction, and the space between them and the perivascular space is again filled with fluid.

* Frey's Histology, by Barker, p. 577.

Cerebral Anœmia.—In order to approach anything like an explanation of the different forms of headache, we must arrive at some definite conclusions regarding the quantity of blood within the brain, and how anæmia is brought about when the supply is deficient and its quality altered. It is computed, as we have before noticed, that the brain receives fully one-fifth of the whole blood in the body (Haller), a circumstance which irresistibly betokens its immense vigor and activity, and connects it with consciousness, and thought, and feeling—in fact, with all the higher attributes of the mind of man.* In no organ of the body is it more essential that blood should be freely supplied than to the brain, if its functions are to continue active and energetic. The immense pre-eminence assigned to it as the mental organ seems naturally to require an abundant vascular supply; for mental changes and nervous waste are perpetually going on, and under the influence of strong emotion or excitement, products are removed from the system by the skin and kidneys in excess of what ordinarily occurs, especially in the amount of phosphates excreted. I may mention, as bearing on the point, the case of a gentleman sixty years of age, in whom the symptoms of cerebral anæmia are well marked. The urine is loaded with phosphates when the head is confused, and the brain is overfatigued; but after

* "In the performance of an idea, as in the performance of a movement, there is a retrograde metamorphosis of organic elements; the display of energy is at the cost of highly organized matter, which undergoes degeneration or passes from a higher to a lower grade of being; and the final retrograde products are, so far as is at present known, somewhat similar in muscle and nerve."—*Maudsley.*

rest and repose they disappear, and the secretion becomes natural.

In the brain the demand for healthy blood is twofold. In common with all the tissues of the body, it requires a due supply of nutrient material for the maintenance of its structural integrity and functional efficiency, but a more urgent demand is for the oxygen which is conveyed by the hæmoglobulin of the red corpuscles. Oxygen is absolutely necessary for the evolution of nerve-force in all its forms. It is the absence of oxygen from the blood in the cerebral capillaries which causes death to occur in cases of suffocation in three or four minutes; and consequently it is plain that a deficiency of it must impair the activity of the nerve-elements of the brain.

Whenever the red corpuscles with their constant supply of oxygen are not passing through the capillaries of the brain in sufficient number we have cerebral anæmia. This may be due to the state of the blood itself, as in anæmia and cachexia, when the corpuscles counted by the method of Professor Hayem, of Paris, may be reduced to less than half their proper proportion. Or the blood itself may be of due composition, but virtual cerebral anæmia may arise from weak action of the heart, functional or organic in origin, through the slow transmission of blood along the vessels. Or, again, the cerebral blood-vessels may be diseased, and obstruct the passage of the blood by loss of elasticity, or actual narrowing. This is the great cause of the cerebral anæmia of advanced life.

Deficiency in the circulation of the brain will gradually enfeeble the mind, and lower all the functions of the body. We may witness this when there is any drain going on from the system, as in hæmorrhoids, menor-

rhagia, or profuse leucorrhœa. If the blood is wanting in certain constituents, or is contaminated by the presence of others which it ought not to possess, then the mental faculties are clouded and depressed, and the brain indicates disorder. This is remarkably well exemplified in the cachexia of syphilis, and in blood-poisoning from lead, copper, or mercury. The persistent use of alkalies has an equally injurious effect. I am sure I have seen the disposition to cerebral anæmia accelerated by the prolonged use of alkalies and mercurial pills, which some people take to excess because they fancy the liver is disordered, and the brain confused in consequence. They may afford relief for a time by relieving the torpor of the internal organs, to which an enfeebled circulation tends, but the system invariably fails in the long run. The same happens in the acute fevers, which break up and destroy the red corpuscles, and rob the blood of its chief vital properties. When the supply of healthy arterial blood is sufficient, and the cerebral circulation is stimulated to activity, the thoughts are quick and bright, and the pleasure resulting therefrom is uniform and consistent; but when the flow of blood is unusually rapid, and the vessels are distended and throbbing, then mental excitement ensues, and a disorderly succession of perverted thoughts and exalted intentions arise, which are all created by a disturbance in the balance of the circulation.

The rush of blood to the head, which some people feel when they are the subjects of cerebral anæmia, is to be thus explained: Emotion or sudden excitement causes the arterial circulation to become quicker, and this fills the cerebral vessels too suddenly with blood for the

brain substance to bear it with composure; besides, the venous circulation is slow, and unable to respond to the call at once.

The unconsciousness which accompanies syncope, or fainting, takes place when the heart's action is failing or feeble, and the cerebral functions are no longer stimulated by the usual flow of arterial blood. When animals are bled to death, or a ligature is placed upon the common carotid, convulsions, or anæmia of the brain, are more usual sequences than congestion or inflammation of the lungs. It is obvious that this shutting off of the arterial current from the brain, resembles in the effects produced the symptoms of an apoplectic clot, or the obstruction due to embolism. The surface is pallid, the pulse quick and small, the temperature occasionally rises from the irritation induced, and the muscular relaxation is complete. With the condition of pallor, arising from mere deficiency in the arterial blood supply, there occur headache, loss of memory, petulance and irritability of manner, and indifference to all those subjects which ordinarily possess interest. The brain is badly nourished, and it refuses to respond, for the nerve-centres have lost their tone. The patient lies exhausted in his bed, with slow and feeble respiration, and dilated pupils. If the veins are full, and there is fear or terror, the features may be livid and cold from the effect on the sympathetic system, and, through it, on the ventricular contractions of the heart. The pallor of the eye and its dead calm present a striking contrast to the red and eager eye of hyperæmia. There is often the blank waxen look of despair, with the angles of the mouth drawn down, as though the patient had passed days together in solitary grief. He is restless,

unreasonable, and fidgety, and moves spasmodically from one part of the room to another, like a man whose mind is ill at ease, and stricken with remorse. Now he feels his pulse, now he consults his tongue, and if he has the sensation of numbness or cramp in his legs he dreads the approach of paralysis. If his attention is directed to his head, as the possible cause of his discomfort, he fears the approach of a fit of apoplexy, and is afraid to be alone. In women the condition is more passive.

To keep the brain and the mind in proper working order involves other considerations: it demands a discipline of life which few persons can or will carry out. Their ordinary habits are provocative of change in the nervous tissue, through the stimulants they daily consume, or the laborious life they are compelled to lead. Mental effort is incompatible with muscular strain, and if both are attempted at the same time the supply of blood to the brain will not be maintained, and the tissue will suffer from innutrition. Local congestions overloading some portions of the cerebral mass, and obstructing the free current of blood to other portions, may be the beginning of that anæmia which is so frequently the starting-point of some headaches. I repose here on the rationality of a theory of ill health and disease, which, beginning in anæmia and tardiness of circulation, ends by a series of consecutive changes in impurity of the blood itself. A vital fluid so contaminated destroys at length the vigorous action of the various excretory organs of the body, heaping upon them work which they cannot discharge, and leading to morbid changes of structure. Recent microscopical research has fully demonstrated the exactness and certainty of the lesions in paralysis, and an endless variety

of other forms of disease, when no alteration is visible to the naked eye. When during life the symptoms appear to indicate a cerebral lesion, no disorganization can be discovered after death—not more vascularity or congestion, we are sure, than is constantly present in many degrees of headache; yet the influence of the circulation upon the functions of the brain demonstrates that a deficiency or excess of blood does not interfere with or arrest the respiratory movements, and cause convulsions or delirium. In what manner, or to what extent, disturbance is excited in the cerebral functions by pressure, may yet be a question to determine; but it is certain that a deficient supply of blood, or a state of anæmia, will disorder the brain and cause derangement, as in epilepsy, when the arteries are so affected as to lead to their contraction; while their thickening and diminution, as in atheroma, also render the supply of blood deficient, and by robbing the brain of its proper nourishment lead to disease. Hence uncomplicated anæmia of the brain, involving nothing more than a meagre supply of blood to an organ which demands it in a large quantity, is a common and frequent cause of headache. With this anæmic state there is in these cases a cachectic condition of the blood circulating through the vessels, and this I apprehend is a constant accompaniment of headache.

As a cause of headache this pathological change is one of great importance, though it is not easy to determine during life except through the symptoms produced. The brain presents a pallid appearance, and is of diminished consistence, whilst the red spots alluded to in congestion are fewer in number. In some persons I have known a headache from this cause to be of such a wear-

ing character, and so continuous, that symptoms allied to insanity have been present, and alarm has arisen in the minds of those who have witnessed the sufferer. Now, as congestion results from the overloading of the bloodvessels, the striking feature of this anæmic condition is both an excess of fluid in the cavities of the brain, and an infiltration through its substance, giving rise to the state known as œdema, and causing actual enlargement and flattening out of the convolutions against the meninges. This is by no means an uncommon cause of irritation of the brain and severe headache. And here I may observe in passing, that some pathologists are of opinion that pain in the head is a positive indication that the meninges are involved, and that when they are free there is an absence of suffering.*

In order to understand the subject of anæmia and hyperæmia, it is important to glance at the circulation of the vessels at the base of the brain, and see how freely they are united at their sides and in the middle line. The vascular supply is enormous, and nature has provided a free circulation of blood through the brain, notwithstanding that a large vessel might be obstructed altogether. I think the pain of occipital headache is sometimes induced by the abundant blood-supply, for the basilar artery formed by the union of the two vertebral arteries supplies half the encephalon with blood, viz., the medulla oblongata, the pons, the cerebellum, and the posterior third of the cerebrum (Ellis). The anterior portion of the cerebrum is supplied by the internal carotid, which divides into the anterior and middle cerebral, and the

* See the chapter on Organic Headache.

posterior communicating artery. Now this difference in the amount of blood-supply helps to explain the cause of frontal headache by the fact that the vertebral and carotid circulations are independent, and because they are regulated by different vasomotor influences.

Of the state of the circulation generally in cerebral anæmia we may observe that the very opposite conditions exist to those present in hyperæmia, where the vascular supply is well maintained and the cerebral cells are active. In anæmia the heart's impulse is weak, and the sounds are short and indistinct—the area of dulness being sometimes increased from dilatation of the ventricles; or there may be fatty degeneration of its muscular structure; the pulse is feeble and easily compressible from the unfilled state of the arteries, and the general diminution of blood in the vascular system.

I shall allude further on to local hyperæmia—to one part of the brain being more full of blood than another. In cerebral anæmia there is the same unequal distribution of blood, one portion being more exsanguine than another (except at the base of the brain in the so-called circle of Willis just described), because the cerebral arteries have no communication one with another, and the different vascular areas are distinct and independent. On a little reflection it becomes at once evident that the circulation may receive a check in some part of its curious bendings, and proceed unhindered in others. The different areas of the brain being irregularly supplied with blood, it is clear that the unequal distribution not only causes headache of a nervous type, but gives rise to a perverted or morbid condition of the emotions—to melancholy and suspicion, to distrust and apprehension. And

it also fully explains the effect of posture in relieving or aggravating cases of headache. There are persons who, when suffering from agonizing headache, cannot rest their head on a pillow for even a moment without the face becoming flushed, and the brain throbbing to the verge of delirium; because the egress of blood from the overloaded vessels is not aided by gravitation, and an excessive supply is maintained by the recumbent posture.

Chronic cerebral anæmia, and the headaches that result from it, are to be regarded with anxiety in those persons whose nervous system is hereditarily weak, and whose minds are vacillating and unsteady. A headache of thirty years' continuance is apt to produce permanent change in the temper and feelings, and to diminish the powers of the mind. The fear that organic disease should be developed after a period of depression which has succeeded to pain and suffering, through irritation of the membranes and nervous centres, is a natural one, particularly if hallucinations are present, and the patient has a fixed idea that he has sustained injury or wrong.

It would be an error past redemption not to connect physical disease with mental disease. How often does not the first induce the last? Perverted sensation eventually implicates the action of the cerebral cells, and by its agency brings about irretrievable mischief in the structure of the brain, if not disease of the bloodvessels themselves. The brain assumes an altered appearance; it becomes atrophied and sodden, and the convolutions shrunken and undeveloped. The patient's gait and wasting motor power in the lower extremities accompany the intellectual decay, and he readily succumbs to the influences of intercurrent disease. Sleep is broken and nutrition is

further checked, for the unrested brain cannot fulfil its functions, or repair the waste of its tissue. Disturbed dreams supplant repose, and morbid changes pursue their downward progress.

In hyperæmia the head is hot and the cerebral vessels full, and the functions of the brain are slow and torpid; in anæmia the cerebral organs are irritable and excitable, and the face is pale and the pulse weak; in both the functional activity of the brain is disturbed. In the first case there are sensorial disturbances with exaltation, such as ringing in the ears, or flashes of light; in the latter, diminution of sensorial power. Commonly, however, there is noise in the ears, arising either from some peculiar condition of the nervous apparatus, allied to debility, or to neuralgia; or it may possibly be explained from the partially filled carotid on the petrous portion of the temporal bone.

Long-continued congestion, in which inflammation has taken no part, deranges the connection existing between the nervous and vascular systems, and induces minute degenerative changes in the coats of the smaller cerebral vessels. If these vessels become blocked up or lose their elasticity, the relationship between the brain and the tissues is destroyed, and there ensues degraded nutrition in the proper structure of the brain. In congestion, as well as in inflammation, the exudation of serum or the effusion of albuminous matter takes place, separating the elements of nerve structure from the capillary network, arresting nutrition, and accelerating decay.

Mr. Durham has conducted some interesting experiments to prove that in sleep, when the brain is at rest, it

is anæmic, and no longer requires its accustomed arterial stimulus.

Hitherto it had been generally supposed that the brain was lulled into quietude during sleep by an overcharged state of the cerebral vessels—that congestion and a large blood-supply were most favorable for repose and rest; but the facts adduced by Mr. Durham proved the soundness of his conclusions, and they have since received the testimony of other competent observers. Mr. Durham supports his views by the following experiment:

"A dog having been thoroughly chloroformed, a portion of bone about as large as a shilling was removed from the parietal region of the skull by means of the trephine, and the subjacent dura mater partially cut away. The portion of brain thus exposed seemed inclined to rise into the opening through the bone. The large veins over the surface were somewhat distended, and the smaller vessels of the pia mater seemed full of dark-colored blood; no manifest difference in color between the arteries and veins could be perceived. The longer the administration of the chloroform was continued the more distended did the veins become. As the effects of the chloroform passed off the animal sank into a comparatively natural and healthy sleep. Corresponding changes took place in the appearance of the brain; its surface became pale and sank down rather below the level of the bone; the veins were no longer distended; a few small vessels, containing blood of arterial hue, could be distinctly seen; and many which had before appeared congested, and full of dark blood, could scarcely be distinguished. After a time the animal was roused; a blush seemed to start over the surface of the brain, which again rose into the opening

through the bone. As the animal was more and more excited, the pia mater became more and more injected, and the brain substance more and more turgid with blood. The surface was of a bright-red color; innumerable vessels, unseen while sleep continued, were now everywhere visible, and the blood seemed to be coursing through them very rapidly; the veins, like the arteries and capillaries, were full and distended, but their difference of color, as well as their size, rendered them clearly distinguishable. After a short time the animal was fed, and again allowed to sink into repose; the bloodvessels gradually resumed their former dimensions and appearance, and the surface of the brain became pale as before. The animal slept in a perfectly natural manner. The contrast between the appearances of the brain during its period of functional activity, and during its state of repose or sleep, was most remarkable. In order, however, to be quite sure that I was not misled by fancy, nor yet by faulty memory, but that the difference was really great, I operated on two animals, and kept them alternately in different states. The animals being placed side by side, the appearance in the two cases could be satisfactorily compared."*

When the functions of an organ are active and energetic it is freely supplied with blood, and when it is sluggish and anæmic it receives a small amount of blood. But even this view is not altogether satisfactory, and we are bound to concede some relationship between the blood and the tissues themselves. There is an attractive

* Physiology of Sleep, Guy's Hospital Reports, vol. vi. 1860, p. 153.

force between them. Some organs draw more blood towards them in disease than is the case with others, and this is well shown in remittent fevers and ague, where the mere contraction or dilatation of the bloodvessels through the vasomotor nerves cannot account for it.

The diagnostic symptoms that belong to cerebral anæmia are those we might expect to arise from a weakened brain circulation. There are fits of depression and lowness of spirits; and yet these are not continual, for the patient may be roused to a renewal of his accustomed efforts, and temporarily forget his ailment altogether, if it has not assumed a serious aspect. The patient is fearful and timid, and has a general dread of things and of circumstances never likely to happen; he is overanxious to put his worldly affairs in the best possible security, lest illness should overtake him suddenly; and he would like to make such stipulations for the future as shall overrule the liberty of his successors, and control the ever-changing events of life. Sleeplessness is not an uncommon symptom, but many patients pass sound nights, and in the daytime become drowsy and fall asleep in the chair, or whilst travelling in a train; and this, according to my experience, is most frequent before the brain has passed into the condition which produces actual headache and overpowers the reason.

The pain is most frequently vertical; it occupies the top of the head, which feels hot and burning to the hand. The pain is not throbbing, or bursting, but of a gnawing, scraping character. It may be also frontal, or occasionally occipital, and present most of the characters of nervous headache. The headache of intellectual strain, and severe gastric disorder from overindulgence in alcohol and high

living, is almost invariably frontal, and the veins about the temples and forehead are full, and the face is flushed. In anæmic headache there are noises in the ears, dizziness, and flashes of light before the eyes, especially where losses of blood have taken place, and there is pallor of the skin and lips. Swooning and twitching of the muscles are also common.*

The patient does not resign himself so completely to his misery in this variety of headache; and in the earlier stages of the attack, at least, he is more anxious about his fate, and when he is likely to be well again. When the attack is threatening he is unusually fidgety and exacting, and exhibits a querulousness which is most trying to contend with.

The tongue is furred at the back, if the pain has been of any considerable duration, and there is flatulence, nausea, and constipation. The colon is loaded and torpid from deficient muscular contraction, which is common in all forms of impaired functional activity of the brain; indeed, the one often induces the other. The pupils are sometimes dilated, but frequently they are of medium size, and, according to my experience, when the pain is vertical the pupils are oftener contracted, a symptom which I attribute to meningeal irritation. The ophthalmoscopic signs reveal pallor of the optic disks and dulness of the choroid. The bloodvessels of the retina are generally thin and few, and the optic disk is of a pale and waxy-white hue, which is common to an impeded circulation through the brain, and to anæmic conditions

* See Chapter XIII, on Organic Headache, concerning the seat and character of the pain.

generally. The eyes are sunken in the orbits, and the pulse is slow, labored, and languid. In a patient recently under my care the pulse did not exceed fifty-four beats per minute during the continuance of the headache and exhaustion. In this case there was some dilatation of the left ventricle and enlargement of the heart chiefly due to fatty change. In the majority of cases the pulse is weak and small, owing to the unfilled state of the arteries, and the diminished quantity of blood throughout the vascular system. Slight pressure obliterates the pulse altogether, and sometimes it can scarcely be felt. In other cases the pulse, in addition to being small, is habitually rapid, and the heart's impulse weak and jerking against the thorax. In the case of a patient who was drained from menorrhagia, the pulse averaged 120 for weeks together; the skin and mucous membranes were dreadfully blanched, and yet there was no headache to speak of, and no cardiac murmur whatever. Occasionally a shooting neuralgic pain was referred to the right eye and temple, but it was never vertical, and the severity was greatest some months before admission into hospital, when the hæmorrhage became sudden and profuse.

In the headache of cerebral anæmia, of which the nervous form in delicate women is a good example, the feet and hands are cold, and the surface of the skin generally is dry and often gelid. The gloomy thoughts and wretchedness incident to this anæmic state, too frequently induce a desire for alcoholic stimulants, which slowly steals on, and the patient, who through life may have been most temperate, may resort to this indulgence till it merges into a miserable habit, and destroys the power of digestion by taking away every remnant of appetite. It

is a passion hard to overcome, because it gives temporary relief by dilating the vessels of the brain, and increasing the force of the heart's contraction. So far there is relief; but when this effect has subsided the depression is all the greater, and the headache is increased tenfold.

As to prognosis, recovery is certain if the pain is due to curable conditions, and the system has not been reduced too low. We observe this over and over again in young women who are exhausted by prolonged lactation and hard work, or who have had miscarriages, or been drained by leucorrhœa. When the habits of life can be changed, and the patient is able to avail herself of rest and proper hygienic measures, her debility and headache gradually pass away, as the brain is better nourished. If the condition is incurable, and complicated with organic disease, the headache will persist; and instances of this kind are to be seen among the poor, where all the surroundings are wretched and deplorable.

Treatment.—With respect to the treatment of the headache of cerebral anæmia and exhaustion, it is obvious that this must depend on the peculiarities and special symptoms of each individual case. In addition to the distraction and pleasant society by which the current of gloomy thoughts should be turned aside, and in order that gleams of joy may break upon the patient's path, and disperse those heavy clouds of sadness which add to the depression of the disease, the medical treatment consists in endeavoring to restore the tone and quality of the blood, that the cerebral tissue may be better nourished. The cause must be ascertained and removed if possible. Where men have subjected themselves to great intellectual strain, rising early and going to bed late, there will

be no chance of recovery till these habits are given up. Men so circumstanced only keep themselves going by irregular living, and a too free use of stimulants. If with this high pressure there are pecuniary anxieties and heavy responsibilities, and the patient has no alternative but to remain at his post he is certain to break down. Entire cessation from work, and absolute repose and quiet for a few months or a year, have restored the brain and enabled the patient to resume his duties in moderation. Discharges of all kinds should receive prompt attention, as in menorrhagia and leucorrhœa; and derangement in the assimilative functions should never be overlooked. The tonic effects of arsenic are invaluable (Form. 7–8), and iodide of potassium is indicated if there is a syphilitic taint; in fact those remedies will be serviceable which increase vascular tension, and accelerate the flow of blood in the encephalon. In gouty conditions, colchicum and the alkalies will be useful to remove the *materies morbi* and the product of tissue metamorphosis. If depression should threaten, the addition of carbonate of ammonia will be found useful (Form. 31–32).

Opium is a remedy which, when given in small doses, increases the force of the heart, and produces a soothing influence on the system generally. If employed in combination with a stomachic or aperient, I have never known it to do harm; but if pushed to narcotism, it loses its sustaining powers, locks up secretion, and becomes depressing. I have given it with advantage in half-grain doses, with three grains of powdered rhubarb, at bedtime, in the form of a pill (Form. 102). It has composed the patient and relieved the cerebral discomfort. By restricting the wear and tear of tissue, it increases in some unex-

plained manner the nutritive processes, and is of service in allaying the extreme restlessness and disquietude which are attendant on the anæmic condition.

Dr. Anstie remarks that the soporific effects of opium are not the most remarkable on the system. "In the countries where opium is indigenous, it is an article in daily use with the great majority of the population, by whom it is employed for a very different purpose than that of procuring sleep; in fact, as a powerful and rapidly acting stimulant. . . . When the opium acts efficiently, not a trace of narcosis can be perceived; on the contrary, the vital powers are distinctly raised."*

The ammonio-citrate of iron is one of the best hæmatics and blood-restorers in the whole Pharmacopœia, and is a very valuable drug in combination with the bromides of potassium or ammonium, when it cannot be safely administered alone (Form. 71). But the sudden filling of the cerebral vessels is always to be kept in mind, and regarded with apprehension.

Digitalis is another remedy to be relied on when the heart's action is weak; it appears to strengthen the contractions of the ventricle, and to render them more uniform and regular; hence it is of value in weakness or dilatation from any cause, when given in small doses. In anæmia, where the blood-supply to the brain is not enough for the purpose of nourishment, it increases arterial tension, and thus it becomes of as great service here as it is detrimental in hyperæmic conditions and where the arteries are changed from atheromatous disease. Digi-

* Anstie, On Stimulants and Narcotics, 1864, pp. 147–150.

talis is of no use in anæmic headache, except for the effect it may have on the circulation through the heart itself; a slow pulse, which is commonly attendant on this condition, contraindicates the use of digitalis. I do not think an irregular pulse altogether demands its discontinuance if it does not depend on change of structure; but where there is decided intermission I should hesitate to employ it. I believe that its good effects in these cases are often obtained by combination with a few drops of spt. chloroform (Form. 49–50). The fresh infusion is the best preparation (Form. 51), and next to this I prefer the powder, with a grain of sulphate of iron (Form. 103). In giving the tincture in these cases, it is well to commence with five-minim doses, and gradually increase it to one drachm. Both experiment and observation go far to prove that reduction in the frequency of the heart's action takes place through the influence it exerts on the pneumogastric, whilst it also has some effect through the cardiac ganglia in increasing the force of the heart's contractions, and causing arterial tension. In this way, the arteries becoming fuller and acting with increased energy, the blood is propelled with greater vigor into the veins. Tea, coffee, and quinine act in a similar way.

Belladonna, according to Dr. J. Harley, is another heart tonic, though it is said to weaken the muscular power generally, and to cause confusion of ideas, headache, giddiness, and singing in the ears.* It therefore

* "Harley has found that after the administration of a moderate dose of belladonna the arteries are contracted; but that when a large dose is given, the contraction is replaced by dilatation. The primary contraction is due to stimulation of the sympathetic system, and the

requires to be used with caution, and I should not be disposed to include it among the remedies for this condition. While strychnia dilates the spinal bloodvessels, belladonna does the same for the cerebral vessels; but it seems to me that as it increases the force of the arterial current, it may be profitably employed in some cases (Form. 52–104).

I have seen good effects follow the use of phosphorus in doses (varying from gr. $\frac{1}{60}$ to $\frac{1}{32}$: Form. 89), daily after luncheon, whilst the hypophosphites of lime and soda have been given in calumba morning and evening (Form. 28).

The headache of cerebral anæmia is said by Dr. Smith to be often mistaken for the passive congestive form, and to occur in enfeebled heart power, and enlargement with dilatation and fatty degeneration. "Nitrite of amyl will relieve the intermediate headache. Let the patient inhale three to five drops of it on a piece of cotton, placed

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subsequent dilatation to the exhaustion resulting from the previous overstimulation."[1]

I gave one grain of the extract to a patient who had dysmenorrhœa, in the form of a pill three times a day, and it produced severe frontal headache and dimness of vision, so that she could not see ordinary-sized print; the face was hot and flushed of a crimson hue, and the pupils widely dilated, which gave her a squint and a strange staring look. There was loss of appetite, and difficulty in swallowing from contraction of the pharynx; the girl was very tremulous and agitated, and her sleep was disturbed and broken by horrible dreams. Although she only took three pills altogether (one daily for the first three days), the toxic symptoms did not pass off completely till the ninth day.

[1] On a Case of Diabetes Insipidus treated by Belladonna and Ergot, by W. Murrell, L.R.C.P., British Medical Journal, January 1st, 1876, p. 9.

within one nostril, while the other is held closed."* When this headache is associated with nervous exhaustion, as it very commonly is, he recommends a combination of strychnia, iron, and gentian (Form. 53).

Vomiting, swooning, and faintness are common in cerebral anæmia, and the patient, in a well-marked condition, cannot remain in an upright posture without risk of syncope; for the blood falls away from the vessels, and the elasticity of the arteries not being brought into play, favors venous stasis, because the vasomotor system is relaxed, and the heart's action is consequently depressed. But even then there is another difficulty to be encountered, and this is, that if the cerebral vessels are too excited, and filled with blood, the nerve-centres are excited also, and headache, heat of scalp, and extreme discomfort ensue. I have known the pulse run up from 50 to 84 in the course of a few hours when tonics have been attempted too soon, or the patient has brought on acute indigestion by eating a heavy meal.†

There are two means of acting on cerebral anæmia,—(1) by raising the blood-pressure generally, in which the

* The Therapeutic Effects of Headache, by A. A. Smith, M.D. A Lecture delivered at the Bellevue Hospital Medical College. London Medical Record, September 15th, 1876, p. 392.

† I would here express my obligation to Dr. J. Milner Fothergill for much information derived from reading his two instructive and valuable papers on "Cerebral Anæmia" and "Cerebral Hyperæmia," in the fourth and fifth volumes of the West Riding Lunatic Asylum Medical Reports. In the treatment of these affections I have freely availed myself of many hints and suggestions. These papers will amply repay attentive study, from the orderly manner in which the facts are marshalled, and the physiological reasoning which supports the views set forth.

brain profits; and (2) by acting on the cerebral vessels, and dilating them especially. These two measures may be combined with advantage in many cases.

Alcohol.—Headaches due to cerebral anæmia and exhaustion are frequently relieved by the moderate use of stimulants. A little champagne or claret, or weak brandy and water, may be taken with the meals (but not at odd times) so as to prop up the system with artificial strength. When taken in moderation it dispels the feeling of fatigue and exhaustion, and increases the tonicity of the vascular system; but when the habit is acquired of drinking to excess it produces incalculable harm, by enfeebling the digestive power, and aggravating the headache and confusion. The gastric juice, which is poured out in additional quantity, becomes less responsive to the stimulus which invited its secretion, and in place of it viscid mucus and fermentative products arise. The more concentrated the stimulant the more injurious are the consequences on the mucous membrane. The hot and burning sensation which is experienced on swallowing a full potation of brandy is due to the action of the alcohol on the tissues, the mucous membrane becoming white and puckered up. Dr. Lauder Brunton says that in common with hot metal, or corrosive sublimate, it coagulates albumen, and that the white color of the mouth is "no doubt due to the precipitated albumen on the surface obscuring the red color which the circulating blood imparts to the tissues beneath."

The influence which alcohol exerts on the mucous membrane of the stomach is precisely similar. We are so well acquainted with the gastric uneasiness which accompanies the dry hot mouth of a previous night's de-

bauch, that a general conviction among the public has arisen that the state of the one organ is the index of the other. "When the stomach is empty its mucous membrane, as seen through a gastric fistula, is pale, and only covered with a little mucus. If a little alcohol is now introduced, the bloodvessels of the mucous membrane dilate, and it becomes of a rosy-red color; its glands begin to secrete copiously, beads of gastric juice stand upon its surface, become larger and larger, until they can no longer preserve their form, when they coalesce and run down together in a little stream."* The very opposite condition follows a large dose; the mucous membrane becomes pale, and the secretion of irritative mucus takes the place of the gastric juice.

This leads me briefly to consider the utility of alcohol as a therapeutic agent. Overindulgence in alcohol (alcoholism) is a formidable disease of the nervous system. In its early stages it is characterized by derangement of the assimilative functions, as dyspepsia, nausea, and congestion of the liver; and, later on, by failure of nutrition, muscular weakness, diminished intellectual force, and gradual degeneration of the nerve-centres and tissues of the body.

When alcohol is habitually resorted to in excess, its action resembles an overdose of opium, chloroform, or ether, and these direful consequences are due to the impregnation of the blood with a large percentage of the poisonous agent. "It may cause the corpuscles to run

* The Physiological Action of Alcohol, by T. Lauder Brunton, M.D., F.R.S., in The Practitioner, January, 1876, p. 61.

too closely together, and to adhere in rolls," converting their clear outline into an "irregular or starlike edge," and changing "the round corpuscle into the oval form." These changes appear to be due to the action of the spirit in extracting the water contained in the corpuscles.* "It may fix the water with the fibrin, and thus destroy the power of coagulation, or it may extract the water so determinately as to produce coagulation."†

Experimental physiology has aided us immensely in explaining the action of alcohol on the nervous system. "If we surround a living nerve (partially dissected from its connections) with alcohol of a certain strength, we find that it becomes paralyzed, *i. e.*, incapable of transmitting impressions through its affected part; while a very weak mixture of alcohol and water is incapable of producing this effect. Similarly, if an animal absorb into his circulation a certain quantity of alcohol within a given time, the nerve-centres and the peripheral nerves become (though in less degree) paralyzed."‡ This experiment forcibly teaches us that blood so charged with alcohol is totally unfitted to support the nervous tissue in health; "there is, however, a co-operative cause of no small importance, namely, it has been ascertained by the researches of various observers that the impregnation of the blood with large quantities of alcohol interferes with its absorption of oxygen,"§ and lessens the oxidizing

* On Alcohol, a course of six Cantor Lectures, delivered before the Society of Arts, by B. W. Richardson, M.D., F.R.S., 1875, p. 45.

† Ibid. p. 46.

‡ Reynolds's System of Medicine, Alcoholism, vol. ii, p. 144, by F. E. Anstie, M.D, F.R.C.P.

§ Ibid. p. 145.

power of the red corpuscles.* A moderate amount of alcohol, by dilating the minute bloodvessels, and stimulating the action of the heart, is a remedy in cerebral anæmia not to be lightly set aside, when the circulation is reduced below its normal activity; for, by improving digestion through its action upon the gastric nerves, it enables food to be digested which cannot otherwise be assimilated, whilst it furnishes in itself a certain amount of oxidizable material, and is in so far a form of food; but carried beyond a certain point, it reduces nervous control, and as doing so is an indication of evil augury. The heart beats quicker, and as it loses force in proportion, its power is too weakened and impaired for any prolonged effort or exertion. Some cases of cerebral anæmia, in which headache is the most prominent symptom, have yielded to a moderate use of stimulants, from the dilatation of the vessels and the better supply of blood. The slackened tide of the circulation has gained a new impetus and vigor, and all the functions have derived additional stimulus to ward off threatening mischief; but taken immoderately, or on emergencies, the physical danger done to the animal economy is manifested in organic deterioration, and in the shrinking and alteration of the nervous texture. To these succeed muscular weariness, confusion of thought, looseness of ideas, and irresolution of purpose. Heavy dreams and restless sleep increase the headache. As the prostration of vital energy creeps on, the mind loses its grasp of recent events, as in childhood, into which it may be said to pass

* The Physiological Action of Alcohol, by T. Lauder Brunton, M.D., F.R.S., in The Practitioner, February, 1876, p 122.

a second time, while failing speech is the harbinger of a general paralysis and a total wreck of all that was formerly so compact and powerful.

If in cerebral anæmia drink is too much indulged in, the sufferer wakes with a diffused headache, vertigo, and flashes of light before the eyes. He has many of the symptoms which herald the approach of intoxication; a mental disquietude takes possession of him, and he is painfully apprehensive of danger in open daylight, and exceedingly nervous about his state of health. His whole character is changed; tears are shed and dried up in a moment; his face becomes blank and expressionless, and his eyes watery and inflamed. For some years past I have had under observation a case of headache from cerebral anæmia, where the chief symptoms were kept up by the injudicious use of alcohol. The deleterious consequences chiefly showed themselves in disorder of the gastro-intestinal mucous membrane, while on one occasion profuse hæmorrhage from the stomach and bowels took place. These symptoms were so severe that ulceration of the stomach was at one period suspected, but abstinence from all stimulants, and a milk diet, rapidly improved the condition. It was followed, however, by a relapse on two separate occasions, when the old habits were resumed, and nausea and bilious attacks were of common occurrence. Other symptoms supervened, indicating nerve degeneration; a tremor of the lower limbs, and unsteadiness of gait, similar to what is observed in delirium tremens.* The face was generally pale and

* "The worst sign of impending nervous change is muscular instability, irrespective of the will; that is to say, an involuntary muscular movement whenever the will is off guard. . . . In the motor centres of the nervous organization the foreign agent is creating dis-

sallow, but it would flush under ordinary conversation, and the pulse, which was habitually small and slow, would become quick and tremulous. Then ensued the most painful headache and confusion of ideas—to use the patient's own phrase, "his head went all wrong," and he only obtained relief by assuming a recumbent posture in a dark and quiet room, and sleeping for three or four hours. After this rest he would sometimes wake up comparatively well.

The amount of alcohol weighed by the standard of what a man takes in health (when all the excreting organs are actively performing their functions) is no criterion of his capability to tolerate it in disease. In the latter case elimination is repressed, and his nerve-centres are the special organs to bear the brunt of the evil. When the appetite is poor, and an insufficient amount of nutriment is consumed, the alcohol is rapidly absorbed from the walls of the stomach, and the liver is the first organ to undergo structural change. All remedies containing alcohol in excess lessen the excretion of urea and carbonic acid, and beer* is especially a compound which interferes

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turbance of function. The fact is communicated to the muscles by the nervous fibres, and the active involuntary start of the lower limbs rouses the sleeper in alarm. Ignorant of the import of these messages of danger, the habituated alcoholic continues too frequently his way, until he finds the agitated limbs unsteady, wanting in power of co-ordinated movement."—*Diseases of Modern Life*, by B. W. Richardson, M.D., F.R.S., p. 265.

* One pint of beer (20 ounces) will contain—

Alcohol, ...	1 ounce
Extractives, dextrin, sugar, . .	1.2 " (524 grains)
Free acid, ...	25 grains
Salts, ...	13 grains

—*Practical Hygiene*, by Dr. Parkes, 4th Edition, p. 257.

"One ounce of alcohol is equivalent to two fluid ounces of brandy

with the elimination of fatty and nitrogenous matters, heaping upon the system partially oxidized products, which provoke gout and liver disorder.

Our knowledge of the action of alcohol is very imperfect, but it may be said to be absorbed into the system after its reception into the blood, escaping in very small quantities by the lungs, the skin, the kidneys, and the bowels; so that it is now a generally received opinion that a considerable quantity disappears in the body.* The experiments of the late Dr. Anstie, Thudichum, Dupré, Baudot, and others, show that the elimination of alcohol is very trifling through the kidneys. Although there is some difference of opinion as to the amount excreted, most observers are tolerably agreed that it is very small. The constant consumption of large quantities of alcohol leads to the accumulation of fat in the system, and produces degenerative diseases of a fibroid and fatty

(containing 50 per cent. of alcohol), or to five ounces of the strong wines (sherries, etc., 20 per cent. of alcohol), or to ten ounces of the weaker wines (claret and hocks, 10 per cent. of alcohol), or to 20 ounces of beer (5 per cent. of alcohol). If these quantities are increased one-half, $1\frac{1}{2}$ ounces of absolute alcohol will be taken, and the limit of moderation for strong men is reached."—*Ibid.* p. 277.

* "When only one fluid ounce of absolute alcohol was given, none could be detected in the urine. We found that in a strong healthy man, accustomed to alcohol in moderation, the quantity given in twenty-four hours that begins to produce effects which can be considered injurious is something between one fluid ounce (= 28.4 C. C.) and two fluid ounces (= 56.8 C. C.). The effects which can then be detected are slight, but evident, narcosis, lessening of appetite, increased rapidity of rise in the action of the heart, greater dilatation of the small vessels as estimated by the sphygmograph, and the appearance of alcohol in the urine. These effects manifestly mark the entrance of that stage in the greater degrees of which the poisonous effects of alcohol become manifest to all."—*Ibid.* p. 277.

nature. "The brain and its membranes, and its vessels, suffer early and principally; and Kremiansky has produced hæmorrhagic meningitis and pathological changes in the brain vessels and membranes in dogs by giving them alcohol. There is no question that several brain diseases, including some cases of insanity, are produced by excess of alcohol. So, also, degenerative changes in the stomach, liver, lungs, and probably in the kidneys, result from immoderate use."—(Parkes.)* Unfortunately there are many forms of bodily weakness and mental wretchedness which drive the sufferer to seek stimulants, not only from the gratification he feels in the indulgence, but to drown his misery in excitement and forgetfulness. Among the diseases which impel persons to drink nervous affections and periodical losses of blood are the most frequent, and the dose which at first restores the nervous system to its healthy standard is soon carried beyond reasonable limits. The relief furnished by alcohol in the misery of cerebral anæmia is one of the most fertile sources of drinking habits, especially among women.

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* "My friend, Dr George Johnson, informs me that out of 200 patients with Bright's disease, from all causes, he found no less than 53 were drunkards."—Quoted from Parkes's *Practical Hygiene*, 4th edition, p. 276.

CHAPTER II.

THE HEADACHE OF CEREBRAL HYPERÆMIA.

General and Local Causes—Active and Passive Hyperæmia of the Brain—Condition of the Heart and Arterial System in some Cases of Surgical Pyrexia—Gouty Hyperæmia—Active Hyperæmia sometimes due to Structural Delicacy in the Walls of the Bloodvessels—Connective Tissue Overgrowth in the Brain—Nature and Causes of Passive Hyperæmia or Congestion—Anatomical Changes in the Vessels and Meninges—Symptoms of Hyperæmia—Symptoms and Pathology of Sunstroke—Effect of Bloodletting and Cold in reducing the Temperature of Hyperpyrexia—Hyperæmia due to Intellectual Strain and Bodily Exertion—Relation of the Tissues to their Blood-supply, and the Effect of an increased Blood-supply upon the Growth of a Part.

Treatment—Occasional Utility of Venesection—Value of Aconite, Tartar Emetic, and Saline Purgatives—Friedrichshalle and Hunyadi Janos Waters—Moderation in Diet and Avoidance of Stimulants—Importance of Walking Exercise—Effects of Bromide of Potassium, Opium, and Hydrate of Chloral in diminishing Cerebral Excitement and relieving Headache—Action of these Sedatives on the Nerve-cells—Ergot of Rye—Therapeutic Effects of Cold, and its Mode of Action—Utility of the Ice Cap in controlling Cerebral Hyperæmia and Vascular Excitement.

When an increased quantity of arterial blood passes through the encephalic mass it constitutes the condition known as cerebral hyperæmia. It is obvious that the veins at the same time are full and distended, and hence

a state of venous congestion is established. If it continues, the dilatation is attended with a retardation of the blood-current through the veins, to which succeeds a diminished flow through the arteries also.

It will be pointed out in another chapter that there are no more common causes of congestive or hyperæmic headache than overprolonged thought and too great mental occupation. When the mind is attentively engaged on any special line of abstruse reasoning, or taken up with care and anxiety about worldly affairs, the effect of this concentrated attention is to dilate the arterial vessels, and to admit a larger quantity of blood than usual to the cerebral cells, by which they are overwhelmed. "The activity of an organ is in strict relation to its blood-supply, and the capacity of each brain from time to time, not as compared with other brains, depends upon the amount of arterial blood passing into it. Such is the true physiological cerebral hyperæmia of brain activity, contrasted with the anæmia which is an essential factor of sleep. As sleep comes on the brain falls, becomes paler, and many of its bloodvessels that could be recognized during the waking state become undistinguishable. When consciousness returns in the act of awaking, the process is reversed; the brain fills, grows ruddier, and the vessels which were lost sight of in sleep can again be distinguished by their enlarged calibre. Such is the difference betwixt the conditions of sleeping and waking—so far as the blood-supply goes, but no further."* As the brains of most persons are kept in a state of great activity

* Dr. J. Milner Fothergill on Cerebral Hyperæmia, in West Riding Lunatic Asylum Reports, 1875, vol. v, p. 172.

at the present day, the vessels are habitually full, and the tissue is increased in vascularity. This is proved to be essential for the maintenance of their healthy functions, and they would even be arrested if the supply of arterial blood was deficient.

Cerebral hyperæmia as a morbid state is a frequent cause of headache; especially of that variety in which the nervous substance and the bloodvessels are both concerned. The brain is increased in volume, and presents a turgid appearance when it is superficially examined. The small red points which are observed when the brain is sliced are the mouths of open bloodvessels, and in some hyperæmic states of the brain they exude a good deal of dark blood, as where death has resulted from bronchitis and whooping-cough, or from fever, and organic disease of the heart and kidneys, which have induced coma and stagnation in the contents of the venous vessels. A faint reddish or pinkish tint of the cerebral substance is not uncommon in the case of children who die of convulsions or meningitis, and this is attributable more frequently to the same pathological change than to actual inflammation and the products that arise from it. This condition is, I believe, a common exciting cause of headache. It leads to local congestion (partial hyperæmia), and often indicates the seat of suffering. When a change of this character is present in a well-marked degree, and has come on rapidly, death may take place from severe congestion without the occurrence of actual hæmorrhage, or comminution of the brain.

There is an active and a passive hyperæmia of the brain—two opposite conditions due to separate causes, and presenting a distinct set of symptoms. In the active form

the arteries contain a larger quantity of blood than usual. Active hyperæmia of the brain occurs with violent action of the heart, or excitement of the circulation, from fever and so forth, as we have already seen. If the nerves are healthy, they may undergo some degree of pressure from distended vessels without causing pain or disturbance; but if they are oversensitive, any change in the force of the circulation at once distresses them; and hence it happens that an excited action of the heart from running, palpitation, or violent coughing in pulmonary disease, aggravates the nervous suffering if long continued. But this by no means can be accepted as a rule, for the exertion of wrestling, running, and active gymnastic sports, which subject the cerebral vessels to extreme pressure from the accumulation of blood within them, does not cause pain and suffering; and we can only infer that this exemption arises from a healthy condition of the nerves, unless the fulness and congestion have been of such duration that a change has taken place in them. I am glad to be supported in this view by so able an authority as that of Dr. Handfield Jones, who observes that the effects produced by cerebral hyperæmia vary according to the condition of the nervous centres, and that when the organ is healthy, a moderate hyperæmia does not disorder their action, but that in weak and excitable subjects the excitement may be very great.*

When febrile symptoms follow surgical operations, we may sometimes witness high temperature, and intense excitement of the arterial system. There is tension in the pulse, a tumultuous and rolling action of the heart, and

* On Functional Nervous Disorders, Hyperæmia of the Brain, 1870, p. 88.

an exaggeration or modification of its sounds, followed in some fatal cases by the deposition of fibrin in one or more of its chambers. An indescribable weight and confusion in the brain, with headache and dizziness, are experienced, which are more rapidly relieved by cold to the head than by any other measure with which I am acquainted; except in some cases where venesection is so far to be credited with reducing the temperature, that it has been known to refuse to fall till bloodletting was practiced. I shall consider this more fully when we come to speak of the treatment.

This form of hyperæmia is witnessed to perfection in the high inflammatory fever which sometimes succeeds great surgical operations, more particularly in young full-blooded persons, who are not emaciated or otherwise reduced by the disease; or who have not lost sufficient blood at the time of operation to control excessive reaction. If at the commencement of these symptoms the skin is dry and pungent, the pulse is generally hard, tense, and rapid; the conjunctivæ are reddened, the carotid arteries beat violently, and the jugular veins are likewise full and pulsating; the heart's action is tumultuous, and strikes vehemently against the walls of the thorax; the sounds are muffled and run together, or the first sound is soft and prolonged, both at apex and base—just what might be expected from the alteration in the relative proportions of the blood-corpuscles, and the rapidity with which the organ has to deal with the obstruction offered by the deposition of fibrinous coagula in one or more of its chambers. With this state of vascular excitement there are disturbances of sensibility, which partake more of an irritating than of a painful character. There is throbbing

over the forehead and vertex of the head, and a feeling sometimes of contraction, and at others of bursting—I have heard it also described as a disagreeable or nasty sensation; the sight is dim, and the patient prefers darkness to daylight; sleep is broken and disturbed by restless dreams, till the head is cooler and the temperature reduced. The constitutional symptoms are not so alarming when the skin is bathed in sweat and the kidneys are acting freely, for then the tension is to a great extent taken off the arterial system, and the determination of blood to the brain is lessened; the pulse is more compressible, the confusion of ideas is mitigated, but the face may assume a purplish flush, and the lips become of a dark-livid red. In cases of this character the injudicious use of stimulants, even in the shape of hot tea or coffee, aggravates the symptoms of cerebral excitement, and increases coagulation in the vessels, till they are on the point of rupture, or so distended that they cannot propel their contents; and at last induces effusion in the neighborhood of the large vessels at the base of the brain, with a torpid and comatose condition.

Some persons of a sanguine and excitable temperament suffer from active hyperæmia, or determination of blood to the head. They experience sound health till something ruffles them, or opposes their plans, and then it is readily induced by alcoholic stimulants and high feeding. It cannot be said that there is too large a quantity of blood in the body; on the contrary, the predominance of the nervous over the vascular element renders it probable that there is habitually an insufficient supply for the demands of an overstrained nervous system. The brain in these cases is exposed suddenly to a sort of del-

uge; and two factors are concerned in the mischief. A disturbed stomach transmits its irritation through the sympathetic system to the brain, already overloaded with blood; and as the vasomotor nerves become relaxed, a further increase of blood overpowers the brain in consequence, apart from the hyperæmia which the increased activity of the systemic circulation induces. Persons whose digestive organs are weak and sensitive, or who sit down to a meal agitated and disturbed, soon experience discomfort and excitement; the head aches violently, the face flushes scarlet, and no ease can be obtained; the temporal arteries throb, and the pulse is full and frequent. Everything that is taken causes nausea and vomiting, and no relief is forthcoming till a few leeches are applied to the head, or the contents of the intestine are washed out by active purgation. Instances of this kind occasionally present themselves in the practice of our profession. When the headache continues severe, and the intelligence becomes blunted, so that the patient can scarcely stand or walk, a moderate bloodletting or a free epistaxis has been followed by immediate relief, and the cerebral congestion has disappeared. If no revulsive measures have been resorted to, or the loss of blood has not occurred, the symptoms of active congestion and intravascular pressure may be converted into those of effusion and fatal apoplexy.

Active hyperæmia is very commonly seen among men who have passed the meridian of life. They are of stout configuration, and the face is full and florid; the conjunctivæ are injected, and the pulse is firm and incompressible. They easily tire and become breathless on exertion if they attempt to walk at a moderate pace, or

ascend a hill, which is one reason why sedentary pursuits or actual idleness are more congenial to them than outdoor occupation. Such men as these need be endowed with immense energy and force of character to willingly encounter fatigue and determine to live abstemiously, when the constitutional diathesis impels them in a direction which, however detrimental to their health, is at least acceptable to their feelings. The ordinary precautions against illness are disregarded and set aside, and the patient never pauses to consider that his mode of living is injurious, but goes on in the same course. His mental condition is eminently characteristic. However amiable he may be by nature, irritability becomes a new and striking feature in his character, surprising his most intimate associates, and those who have known him best through life. Trifling annoyances vex him and put him out, and he bursts into fits of passion and violence, which would not disturb the mind of a man in health. As soon as these outbursts of passion are over, the mind is restored to reason and reflection; and, as he finds relief, so he admits the weakness that overtook him. He is what is called low at times, and suffers acutely from throbbing headache. These persons have lived too well from their early manhood, and indulged in food of a nitrogenous character. In consequence of this stimulating diet, and the patient's lethargy and inaction, effete matters accumulate in the blood, and throw upon the kidneys and other excretory organs an amount of labor which provokes structural change. A gouty element is the disturbing foe when more visible indications are wanting; and one of the first morbid changes to arise is a hyperæmic state of the kidney from the excessive sup-

ply of blood, so that the organ is no longer able to completely discharge its functions. Then follow spasm of the arterioles, and that rise in blood-pressure which leads to hypertrophy of the left ventricle, and the transmission of blood to the brain in greater force. As therefore the heart increases in size from the additional duty it is called upon to discharge, so the natural tissues of the kidney become diseased, and the vessels of the brain atheromatous and liable to rupture from the distension to which they are subject.

The condition of cerebral hyperæmia is denoted in some persons (especially men of full or gouty habit who are approaching sixty years of age), the face being florid, and the capillaries full and distended. Not unfrequently the nose is marked with acne rosacea, from the too free use of stimulants and overindulgence. There are noises in the ears, and the head is confused and aches fearfully —it is a deepseated pain, as though a nail was being driven into it; and the pulse is full, tense, and hard— it is often to be felt rigid from atheromatous degeneration; and the bladder is sometimes irritable from prostatic enlargement. Structural change may begin in the kidneys, and, by causing a rise in blood-pressure, propel the blood with greater force through the encephalic arteries; thus is brought about an overloaded state of the cerebral arteries, and an increase in the growth of the tissues which enter into their structure. The heart's sounds afford evidence of the mischief which the arterial tension discloses; the impulse is frequently increased, and the area of præcordial dulness also; whilst the aortic second sound is accentuated. In a case which has furnished these remarks, the patient was sixty-five years of age, and there stole on

gradually a forgetfulness of passing events, and an indistinct utterance, which finally ended in the rupture of some vessel near the base of the brain.

There is another form of active hyperæmia due to structural delicacy in the walls of the bloodvessels, and their feeble resistance. In consequence of their thinness they yield to the pressure of the blood-current when the heart's action is increased, and too much pressure is put upon them; the capillaries become injected and bright, and the patient feels the rush of blood to the head. These patients have most likely dilated vessels also, through paralysis of the vasomotor nerves, and consequently they all the more readily yield to an increased pressure of blood. Some persons suffer from this congestion after running or engaging in active exertion; and it is followed by symptoms of sickness and severe headache. It is observed in many acute pulmonary diseases, and is the chief cause of fatal exhaustion in these cases. If a meal has been recently taken by a person whose nervous system is agitated and depressed, or if he exposes himself to the sun or to noise and confusion after it, the mental excitement disturbs the process of digestion, and provokes a hyperæmic state of the cerebral vessels. It is not uncommon as a consequence of aortic insufficiency, the result of endocardial inflammation. In these cases the carotids are too full of blood, and their tension and impulse are strikingly apparent. The undue pressure to which the left ventricle has been exposed has led to dilatation and hypertrophy of its structure, from the augmented effort it is called upon to make, and it sends onward an increased volume of blood through the diseased and altered orifice. Now, what are the ultimate consequences

of mitral valvular derangement on the cerebral circulation? Every time the ventricle contracts a smaller quantity of blood is discharged, and some portions during the systole flow back again, further crippling the auriculo-ventricular valve, and disabling or half paralyzing the left auricle. This induces engorgement of the pulmonary veins, and, indeed, of the whole venous system, so that headache and dizziness are common, and death from congestion or embolism becomes intelligible. In aortic stenosis the arteries are scantily filled, and there are no signs of venous engorgement; pallor of the face, syncope, and anæmia of the brain are the characteristic symptoms, just as hyperæmia of the cerebral circulation is associated with valvular insufficiency.

Again, any condition which arrests or interferes with the cutaneous circulation will cause active hyperæmia, as severe exposure to cold, or the cold stage of intermittent fever; and then there is also paralysis of the vasomotor nerves accompanying the cerebral bloodvessels.

In the brain, as in other organs, when it has long been subject to hyperæmia, there is developed a certain amount of pathological connective tissue, which gradually contracts. In the liver and kidney this pathological process is accompanied by reduction in the bulk of the organ. The brain being in an unyielding bony case, its contraction is accompanied by the effusion of fluid. This is a condition known as the water-logged brain, common in some forms of insanity. Niemeyer has given it the name of Hydrocephalus ex vacuo.*

Connective tissue overgrowth in the brain, as a conse-

* Niemeyer, Practical Medicine, vol. ii, p. 247.

quence of alcoholic indulgence, has been pointed out by Schroeder Van der Kolk, and physiological investigation would seem to establish the fact that the absorption of alcohol into the cerebral tissue causes the nerve-cells to undergo important physical changes, producing degeneration and disease.*

Passive hyperæmia or congestion arises from any pressure on the jugular veins interfering with the free return of the blood to the heart. We have examples of it in cases of glandular enlargement of the neck, as in bronchocele, aneurisms of the aorta, and hypertrophy of the thyroid; in tricuspid insufficiency; in the violent expiratory efforts produced by straining and coughing, as in whooping-cough, when the blood accumulates in the general circulation rather than in the pulmonary. The brain is overloaded, and maintained in this unhealthy condition because the obstacle cannot be overcome. This does not apply to the circulation through the lower organs of the body, where it is much less impeded. In all diseases of the heart, particularly when the right ventricle is diseased and acts imperfectly, the overfulness of the veins leads to capillary engorgement because the blood is obstructed in them, and this is a common cause of cerebral hyperæmia. In valvular disease of the right heart this affection is far greater than when it occurs on the left side, because the return of the blood is enormously impeded.† In cases of chronic bronchitis, with a weak and dilated right heart, this state is also of common occurrence. In

* Effects of Alcohol on the Brain, Lancet, September 30th, 1876, p. 470.

† See Chapter V, on Congestive Headache, where this subject is continued.

pleuritic effusion and compression of the thoracic viscera, in emphysema and chronic diseases of the lungs, there is congestion of the brain from the overloading of the systemic circulation, when the right heart is not proportionately enlarged to overcome the impediment.

But I must not omit another important phase of the gouty diathesis, which I shall briefly allude to here, as it is rather of a passive than of an active character. Headache is the prevailing symptom of this condition, frontal and deepseated, and so continuous that the nerve-structure is gradually brought to the verge of disease. It may continue for years, and end in apoplexy or rupture at last. The well-to-do rector, or the country squire who has seen sixty summers, is the victim of this condition; they are prone to gouty bronchitis on any change of weather, and there is vesical irritability with an abundance of lithic acid in the urine, and very commonly enlargement of the prostate gland. The digestive functions are constantly getting wrong, and there is a foul tongue, with much flatulence and discomfort after food; the bowels are habitually costive, and need aperients to maintain their regular action. The patient cannot exert himself to his accustomed duty, and is too nervous to seek society. He has confused sensations in the head, and noises in the ears; he moves along slowly and carefully, rather than walks, but with a faltering step withal; and, if spoken to, or stopped on his way, turns round so guardedly that his head seems to have no independent motion from the rest of the body. The heart indicates commencing degenerative change, and the aortic valves are the first to go wrong. Nearly all his disagreeable sensations are referred to the head; and, when

not actually painful, it is too disordered to admit of any exertion. When there is no need for worldly anxiety, he conjures up ideas of impending ruin, and is hysterical or so nervous that life is irksome to himself, and his presence unendurable to others. The blood is here also contaminated with nitrogenous waste, and the cerebral vessels are habitually overloaded from this poisonous source of irritation, to the risk of threatening rupture, particularly also if there is any degree of uræmia. The patient's general demeanor is altered, and dejection of spirits and moroseness of manner are rather the mental traits than excitement and irritability. Still, there is general restlessness and a desire to be doing. The terrific headache and the morbid sensations to which these persons are liable depend on excitement of the cerebral cells, scarcely to be accounted for by any additional supply of arterial blood, but more to venous fulness and stagnation. The relation which this cell activity holds to the blood-supply, and their dependence on one another, have yet to be determined. With this headache and increased local vascularity there is not necessarily associated a general arterial excitement, for the pulse may be soft and quiet, and the face pallid. These latter cases are often the consequence of mental anxiety or overstrain, and the evidences of exhaustion and low blood-pressure are to be observed.

When we reflect on the anatomical changes in the vessels and meninges of the brain, it is no easy question to decide on the appearances they may be expected to present after death. I am not aware of anything constant in the amount of blood in the cerebral hemispheres and vessels, short of actual rupture, which a post-mortem

examination reveals. In the case of children, often after death from head affections, the brain is only moderately congested, and yet the symptoms have been alarming, and death rapid, with insensibility and coma. The best examples of congestion and hyperæmia fail to account for the symptoms during life. But when the continuance of active cerebral hyperæmia has induced pain in the head, disturbances of the mind, and a severe degree of cerebral congestion, it may result in delirium and meningitis. This is by no means of rare occurrence in malarious fevers, which are so common in tropical climates. After death in such cases, the minutest vessels of the brain have been found injected, and the arachnoid thickened and of a deep-red color. Extravasation of blood beneath the scalp and between the dura mater and the skull is found in some cases of this sort. The other internal organs, also, as the liver, stomach, and spleen, undergo enlargement and softening as the result of inflammatory action.

Symptoms of Hyperæmia.—Although I have dwelt at some length on the causes of congestion and hyperæmia of the brain, it would be a deeply rooted error to infer that disturbance in its functions necessarily originates in either state, if actual change of structure is excluded. The brain disturbance in fever arises from the high temperature and a change in the quality of the blood, which is at variance with a healthy condition of the nerve substance; hence delirium and a comatose state in low fevers affecting the brain are not infrequent, where the heart's action is feeble and the blood-supply is also deficient.

In cases of severe sunstroke, where the patient is struck

down suddenly, the symptoms are rather due to a paralysis of the functions of the brain than to a state of hyperæmia. The nerve-centres are overheated and depressed, and, until the temperature is lowered, they cannot recover their action. These facts point out the rational treatment of the disease. "As the hyperpyrexia is due not only to the direct operation of heat on the nerve-centres and tissues, but also to the fever set up by the disordered vasomotor arrangements, remedies, such as may influence this disturbed condition, have been suggested. The results have appeared in some cases to justify the theory; and the hypodermic injections of morphia and of quinine have both been considered to produce good results by their influence on the vasomotor nerves, and their power in retarding tissue change."* The plan of treating sunstroke by the subcutaneous injection of quinine, first introduced by Surgeon-Major A. R. Hall, has been found most successful. It is especially serviceable for troops on the march where ice is unattainable (Form. 115). There is excitement and cerebral irritation in some cases, but in the majority of cases the patient falls down and gasps for breath, as in syncope. The production of heat is increased by muscular exertion, and the body becomes overheated, because perspiration takes place slowly through the high temperature of the atmosphere; and hence the overloading of the vessels of the brain and the other organs of the body, but more particularly congestion of the lungs, and distension of the right heart. Post-mortem examination

* On Sunstroke, British Medical Journal, August 12th, 1876, p. 224, by Sir Joseph Fayrer, K.C.S.I.

verifies this in fatal cases of sunstroke, where the blood is fluid, as in death from lightning and blows on the epigastrium. In mild cases prolonged headache (which is not an early symptom), irritability, exhaustion, incapacity for mental exertion and the concentration of ideas, are induced by it. For it is important to remember that the shock of the seizure and the high temperature together are highly injurious to the nerve-centres, overloading the brain with blood, and sometimes inducing severe meningitis. A brain habitually charged with too much blood is just as likely to lay the foundation of gradual tissue-change, as is the direct operation of heat and exposure to the sun. In the management of these cases of hyperpyrexia Sir Joseph Fayrer insists on reducing the temperature as quickly as possible by the use of the cold douche to the head and body, mustard poultices, and purgative enemata. He relies little on bloodletting, and records that of numbers of soldiers who were struck down in the Burmese war in 1852 by the direct action of the sun, all recovered except two, who were bled on the spot where they fell. These remarks are in accordance with those of Dr. Wilson Fox,* who says that cold is the only means of reducing the temperature in hyperpyrexia. He shows that venesection, in one case to twenty ounces, had no effect in checking the rise of temperature in acute rheumatism; whilst he cites two cases of recovery under his own care, where the temperature in one case reached 110°, and in the other 107.3°. He considers that venesection prejudicially interfered

* On Hyperpyrexia, 1871, pp. 1 and 43. These views are supported in H. C. Wood's work on Thermic Fever.

with the cold applications, and was the cause of death in one case through the exhaustion induced.

In simple congestion the escape of venous blood is arrested, and the blood passes slowly through the capillaries from this overfilling. Both in anæmia and congestive venous hyperæmia, the brain is not supplied with its due amount of arterial blood, and so the cerebral symptoms are allied; and the general condition bears a close resemblance in the two cases.

The pain and irritation induced by active hyperæmia are not precisely alike in all instances. At one time the functions of sensation are more affected than those of motion, and at another time the mental faculties are marked out for special implication. The thoughts are rapid, loose, and unconnected, and the ideas are confused and false. Life is looked at through a false medium. When the sensory functions are involved, there are headache, excitability, and extreme sensitiveness to every impression that goes on around, the slightest sound worrying the patient, and even quiet conversation being distasteful; the light of the sun causes a disagreeable and oppressive feeling to the brain, scintillations of light appear before the eyes, and there are noises in the ears. Some persons experience a condition of hyperæsthesia periodically; it comes on suddenly, and lasts a day or two, then goes away as it came.

There is a form of hyperæmia of the brain in men who tax their intellectual efforts to the highest point, and who at the same time exert their bodily strength by other duties and calls on their attention. They scarcely allow themselves time for their meals, or take them irregularly or hurriedly, and perhaps indulge in stimulants to keep

them up to the right mark. There is headache with disturbed sleep, and pain at the back of the head, or a feeling of blood rushing into the brain; sometimes there is delirium. These persons are nervous and apprehensive, yet they cannot stop the speed at which they are pushed along the stream. Sometimes the pulse is quick, and there is fever; or it is slow and labored, not more than sixty beats a minute, and then the patient is depressed and more or less indifferent about himself. The urine is very changeable; at one time it is high-colored and intensely acid, or it is as pale as water, and contains phosphates in abundance. There may be redness of the face, but often there is pallor and a worn, exhausted look; the patient loses flesh and strength, and the excitement gives place to lethargy and depression. If he indulges too freely in stimulants, melancholy and even mania may result, or apoplexy and paralysis may be the termination. Suddenly the patient feels bewildered and giddy; he staggers or even falls, or he rushes and takes wine or brandy to support his failing circulation. His head is hot; he cannot engage in conversation, and is glad to resign himself to rest and a recumbent posture. After a few hours' rest or sleep, when the venous blood is better circulated, and the supply of a proper amount of arterial blood stimulates the brain and nervous centres to healthy excitability, the patient recovers and goes on again; or if the condition continues to recur from time to time, the nervous substance is structurally altered, and loss of consciousness or convulsions are produced.

It is quite in accordance with clinical experience to have partial hyperæmia of the brain, where certain spots are more congested than others. This may be due to

tumors, partial softening, and localized extravasation, as in lobular pneumonia. An artery may be compressed, or the smaller vessels and the collateral circulation take on congestive action, so that some portions are anæmic and others hyperæmic, and this is what we sometimes see in other organs of the body. Unless there are local symptoms, the cause cannot be found out. There are headaches limited and circumscribed—contraction of one or both pupils, noises in the ears, imperfect vision in one eye, neuralgia of one eye, but never loss of sensibility in one spot, or paralysis of one side. The treatment consists in relieving the local congestion.*

In discussing the question of hyperæmia of organs there are two factors to be included, the omission of either of which would greatly invalidate any conclusion that might be drawn. The first is the relation of the tissues to their blood-supply. This is seen in the increased blood-flow to an irritated part, as a bat's wing, for instance. The other is the effect of an increased blood-supply upon the growth of a part; this is seen in the elongated limbs of chronic joint mischief, and still more vividly in the growth of the cock's spurs, which John Hunter engrafted on the bird's comb; or as happens in the excessive growth of muscle and bone in a limb, from obstruction to the lymphatic circulation. Thus we find that there may be much vascular hyperæmia in a maniacal patient, with but little general disturbance of the circulation. Here the cerebral cells attract blood to themselves in too great a

* "Local hyperæmia, in fact, is not exactly local plethora; it simply implies that too much blood is accumulated in the vessels of a part, without taking any account of the nature of this blood."—*Jones & Sieveking's Pathological Anatomy*, by Payne, p. 44.

quantity. In other cases of congestive headache, as in plethoric persons, there is a hypertrophied heart, with throbbing distended carotid arteries, and an excessive blood-supply to the brain, which excites the cerebral cells and causes exaltation of the special senses, producing the appearance of flashes of light, the sound of ringing bells, and other ideal sensations. At times these conditions are blended, as in the vivid sketch of "Preparing for the House" in the Diary of a Late Physician, where the stout country squire, with a rubicund face, is in a condition of great excitement at the prospect of delivering a speech which would defeat his assailants, and forthwith establish his reputation as a politician.

Treatment.—The first indications that call for fulfilment are to lower the vascular system, and to reduce the cerebral fulness. It is obvious, however, that a separate line of treatment will be required to meet the special peculiarities of each case. If the vascular element predominates, and other measures fail to control the more urgent symptoms, venesection may be demanded to save the patient's life, and there can be no doubt that a full and effective bloodletting has proved of great service. If the carotids beat violently and fill the brain with blood, then leeching or cupping ought to be had recourse to, as becomes advisable in some acute forms of febrile headache in young subjects. In cases of active cerebral hyperæmia, where the pulse is firm and good, aconite, tartar emetic, and other depressants are to be selected (Form. 106). Colchicum, in combination with the alkalies and iodide of potassium, will also be of service (Form. 31–34), if it appears certain that the cerebral vessels are distended, and the blood-pressure is too great. The bowels should

be freely evacuated by saline purgatives (Form. 19) in the early morning. An occasional pill, containing mercury, with or without podophyllin, will rouse the liver and intestines, and so bring great relief to the head symptoms, by tending to subdue vascular excitement and depress the circulation generally (Form. 81–94). If the urine is scanty and acid, and affords proof of lithiasis, which is not uncommon, it will be advisable to take plenty of diluents, and the salts of potash and lithia freely diluted with water. Friedrichshalle, Pullna, and Hunyadi Janos waters on first rising in the morning act quickly on the bowels, and produce no unpleasant effects afterwards; and the same may be said of the aerated waters of Vichy and Carlsbad, which are favorite remedies with some persons of full and torpid habit.

In place of a heavy nitrogenous diet, fish, white meats, and fruits are to be preferred, and fermented liquors and wines should be forbidden.

If the patient has strained his mind, or is advancing in years, venesection or cupping will be of questionable service, for the veins of the brain and sinuses are too full and congested to be relieved by the attempt, and the shock from the loss of arterial blood could not be borne. When, too, the circulation is quiet, such remedies would be productive of harm rather than good, and we must trust to a darkened room, general quiet, and remedies having the sedative properties of hydrate of chloral.

In women the occurrence of the menses often brings relief, if the patient is abstemious in diet and avoids stimulating food. In those forms of congestive hyperæmia from pressure on the jugular veins, leeches may be used to favor the escape of venous blood. When hyperæmia

results from overfeeding and stimulants, lessening the diet, moderation in living, and walking exercise will be necessary; but no two cases are alike, and some modification will be required.

In treatment it is of the highest importance to discriminate the two factors previously mentioned; the first is the relation of the tissues to their blood-supply, and the second is the effect of an increased blood-supply upon the growth of a part. The proportion of each factor in every individual case must be carefully weighed, for in one the circulation needs depressing, and in the other sedatives and rest are the chief indications. In one the line of treatment is to reduce the excessive blood-supply, which keeps up too much excitement in the brain; in the other the excited brain-cells are attracting blood too freely, and the course to be adopted is to lessen activity and their demand for blood. For this condition bromide of potassium, hydrate of chloral, and opium are the chief remedies to rely upon.

With regard to the action of sedative remedies in hyperæmia of the brain, bromide of potassium is one of the most remedial and curative agents we possess in the treatment of nervous disorders. It has been clearly shown by scientific observers that it is a most efficacious remedy in hyperæmic forms of headache, and also in those varieties of nervous headache where the cerebral cells are excited, and the emotional framework is highly strung. As bromide of potassium controls sexual excitement, it may be expected to subdue cerebral excitement also, and dissipate those conflicting thoughts and passions which stir us to anger, and aggravate the trifling incidents of daily life. Our chief experience has been derived from its efficacy in

the treatment of epilepsy. As a calmative and narcotic and as a remedy controlling vascular excitement, it is usually admitted to occupy the first rank. By reducing the irritability and lessening the fits, it controls the congestion on which the headache depends. Clouston (Fothergillian Prize Essay) found half-drachm doses of the bromide of potassium, of tincture of cannabis indica, and of tincture of hyoscyamus very useful in the sleeplessness of talkative mania (Form. 63). I have often given the bromide and the cannabis indica together with great advantage in smaller doses (Form. 64), and I have known full doses of henbane with camphor, either in the shape of pill or mixture, prove an excellent and reliable sedative (Form. 65–93). In the persistent headache which follows sunstroke, bromide of potassium is the most serviceable remedy.* Hydrate of chloral is sometimes given with advantage, either alone or in combination with the bromide (Form. 66–67). When chloral is given alone it acts by depressing the heart's action and lessening blood-pressure, on which the cerebral excitement depends. Men advanced in life, who have still active duties to perform which require mental exertion, find their headaches relieved by a full dose of chloral on retiring to bed. This indicates the hyperæmia of vasomotor paresis. The sleep is sometimes broken and disturbed in these subjects, and there is throbbing and a disagreeable sensation about the temples; but the next night, and for many succeeding nights the sleep is calm and peaceful, and the patient goes about his work with renewed pleasure. This very action makes the drug a seductive one, and it should

* Dr. Morehead, On Sunstroke, in A System of Medicine, edited by J. Russell Reynolds, M.D., F.R.S., vol, ii, p. 142.

never be taken except under medical supervision. It probably has a greater effect upon the vascular system than the bromide, which would seem chiefly to have its action confined to the nerve-centres. Bromide of potassium with digitalis is serviceable if the pulse is fast and feeble and the patient has a weak heart, or has overdone himself in any way.

Ergot is a remedy highly spoken of by some authorities, but I have not employed it with so many more remedies at hand. "I have found it almost uniformly efficacious in reducing excitement, in shortening attacks, in widening the intervals between them, occasionally in altogether preventing the recurrence, and in averting that perilous exhaustion by which excitement is so often succeeded." Drs. Bucknill and Tuke add, "Dr. Browne explains its beneficial action by its influence in contracting the vessels of the brain, and administers the liquid extract of ergot in doses of from ℥ss. to ℥j three times a day, or ℥j to ℥ij of the pharmacopœial tincture."* I do not like these large doses, for the reasons given in another place.†

One of the most powerful agents we possess in the treatment of hyperæmic conditions is cold. Cold applied to the head is admitted to act in one of three ways:

1. By exerting a direct action on the superficial vessels of the scalp, and the parts within the cranium.
2. By diminishing the blood-supply, and contracting the vessels.

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* Psychological Medicine, 1874, p. 745.

† See Chapter XIV, on Headaches of Advanced Life.

3. By exerting a sedative action on the nervous centres.

Some estimate of its power on the capillary circulation may be imagined from the effect of immersion in a cold bath for a few minutes, where the temperature, as in hyperpyrexia, may be reduced several degrees in an incredibly short space of time. M. Marey has shown by a sphygmographic tracing, that after exposure to a cold bath of one minute, there is considerable tension and hardness in the pulse in consequence of contraction in the cutaneous capillaries, and an obstacle to the passage of blood from the arteries. The effects of a hot-air bath, as we all know, is to relax the arterial system, and to produce dilated vessels and general enlargement of the capillary circulation.

The pulse is soft and full, and the increased frequency with which the heart acts diminishes its force and power, enabling the blood to pass freely into the veins.

When cold is applied to the head, one mode of action is considered to be by abstracting heat from the scalp. There may not be a general agreement on the subject, but it seems borne out by practical conclusions. Cold is so powerful an agent that long exposure to it has resulted in the death of the part to which it is applied; and congestion of the internal organs, as the brain and lungs, has been found after death, preceded by a tendency to sleep and apoplectic coma. Here it is highly probable that a brief application of cold may assist in the removal of the venous stasis, which a more prolonged application tends to induce; and there is nothing adverse to the physiological conclusion that cold, by contracting the vessels, may by a sedative action on the nerve-centres, diminish the

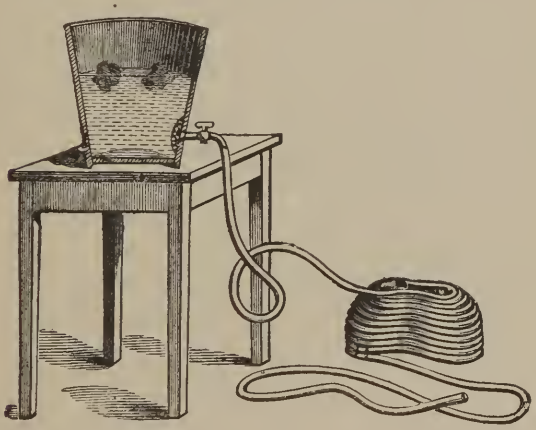
flow of blood generally; and it would appear to have this effect, as it will lower the pulse, and in controlling the action of the heart lessen the arterial supply to the brain. From a series of carefully conducted experiments performed by Dr. Benham on the dead subject, he ascertained "that as long as a fluid of a certain temperature is passing through the vessels of the intracranial tissues, the application of even the most intense cold to the outside of the scalp has no effect in lowering their temperature."* Now this is what might be expected when we consider the deep tissues through which cold has to act. It may be capable of abstracting a certain amount of heat from the scalp and superficial tissues, but can it exert any physiological effect on the tissues within the rigid osseous skull? It seems unlikely that it can do so without causing congestion, or even inflammation; yet, moderately applied, it may, through the influence of the nervous system, control the temperature to some extent. Even in experiments performed on living dogs under the influence of chloroform, although the temperature was temporarily lowered 2°, it did not continue to fall, but soon rose to the normal standard. This, therefore, was rather due to some effects on the vessels through the nervous system and sensory nerves, than to any effect on the blood temperature.

Mr. Knowsley Thornton† (to whom I am indebted for the engraving on next page), about four years ago, introduced into the Samaritan Hospital an ice cap for the

* On the Therapeutic Value of Cold to the Head, West Riding Lunatic Asylum Medical Reports, vol. iv, p. 157.

† Improved Ice-water Cap for applying Cold to the Head in Hyperpyrexia, by J. Knowsley Thornton, M.B., M.C., in Medical Times and Gazette, May 27th, 1876.

head, to be used as the easiest and best means of reducing the high temperature and pyrexia which sometimes succeed ovariotomy. It has received the sanction of Mr. Spencer Wells, and now forms one of his reliable remedies in the after-treatment of these cases. The apparatus is not expensive, and is easy of application. It consists of india-rubber tubing about the thickness of the little finger. This is coiled round so as to form a closely fitting cap for the head, communicating on one side, by means of the tubing, with a pail of iced water, elevated about two feet, and placed on one side of the patient's bed, and communicating on the other side with a pail to receive the



water which has passed through the cap. The two pieces of tubing, in fact,—the one conveying water to the cap, and the other allowing its escape from it,—are the two strings of a cap, so to speak.

The benefit of the ice cap seems to me incalculable in

cases of great vascular fulness, for like cold affusion it exerts a sedative effect upon the heart, and rather encourages the free action of the skin, which is one of the chief means of lessening arterial tension.

When the patient is flushed and excited, and there are headache and confusion of the mind, immediate relief follows the application of the ice cap in a large proportion of cases; the high sthenic action is reduced, and the face loses its florid appearance and becomes peaceful and calm. If bronchial irritation and cough are threatening, they rapidly subside, and the excited action of the heart gives way to a more steady and regular movement, whilst the pulse is also reduced in force and frequency. If the temperature has been steadily rising, it usually begins to fall perceptibly, and if not at once it does so in the course of an hour or two, unless the elevation is due to septic causes; and even in nearly all cases the ice cap may be said to check the rapidity of the rise, at whatever stage of the pyrexia it is applied. When the cerebral symptoms are relieved, and the ice cap is hastily discontinued, the head frequently becomes again hot and uncomfortable, until it is reapplied. Patients are in the habit of begging for it during their recovery, whenever they have once used it; and in many other cases of cerebral hyperæmia which have been caused by alcoholic indulgence, and other causes of nervous exhaustion, with high temperature and febrile disturbance, it is useful. The headache of active cerebral congestion, and the nervo-hyperæmic headache in the acute and early stages, yield more quickly to the ice cap than to all the drugs in the Pharmacopœia; and when this is not obtainable, Dr. Chapman's spinal ice bag is an excellent substitute.

CHAPTER III.

SYMPATHETIC HEADACHE.

Extreme Frequency of this Variety of Headache, particularly in Women who suffer from Menorrhagia and Uterine and Ovarian Irritation—Sympathetic Ganglia of the Uterus—Its abundant Nerve-supply—Effects on the Cerebral Vessels of Section and Galvanization of the Cervical Sympathetic—Researches of Dr. Brown-Séquard and Professor Bernard—Examples of Headache attributable to Ovarian Irritation—Typical Specimen of Sympathetic Headache from taking Ice into the Stomach mentioned by Dr. Symonds.

Occipital Headache—Causes of Pain in this Locality frequently due to an Affection of the Occipital Nerves—Its Significance when of long standing—Mr. Hilton's Opinion of Pain at the Back of the Head as a Diagnostic Sign.

In well-marked examples of this headache, irritation proceeds at a distance from the sensorium, as in the case of decayed teeth, faulty or arrested digestion, and ovarian excitement. The headache is dependent on these eccentric sources of irritation, and the most perfect examples of it happen only when the nervous system is already delicate or impaired.

Abundant instances might be adduced to prove how impressions are conducted along the pneumogastric nerve and the great sympathetic. There is, so to speak, a sort of influence travelling through many channels, and these two especially, till it reaches the brain, where

it changes the conditions of repose into heightened sensibility and morbid exaltation. This influence, when once

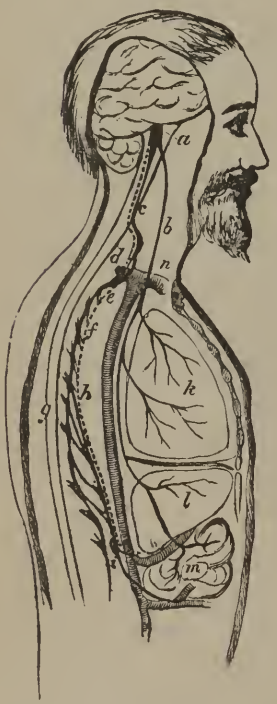


DIAGRAM SHOWING THE COURSE OF THE VASOMOTOR NERVES OF THE LIVER, ACCORDING TO CYON AND ALADOFF.

These nerves are indicated by the dotted line which accompanies them. *a*. Vasomotor centre; *b*. Trunk of vagus; *c*. Passage of the hepatic vasomotor nerves from the cord along the vertebral artery; *d*. Fibres going on each side of the subclavian artery, and forming the annulus of Vieussens; *e*. First dorsal ganglion; *f*. Gangliated cord of the sympathetic; *g*. The spinal cord; *h*. Splanchnic nerves; *i*. Cœliac ganglion, from which vasomotor fibres pass to the hepatic and intestinal vessels; *k*. The lungs, to which fibres of the vagus are seen to be distributed; *l*. The liver; *m*. The intestine; *n*. The arch of the aorta.

excited, produces modifications in the brain, by weakening its inherent strength. The nature of these changes, and the relations that exist between organs so remote and distinct, must be recognized before we can ascertain their mutual relation, and how an antagonism in their functions is produced.

A nervous headache is as often sympathetic as it is idiopathic; that is, it is as much the sequel of faulty action in a distant organ as it is in the brain itself. Sympathetic headache is of frequent occurrence in women of excitable temperament, and is periodically excited in them when the uterine loss is natural, or scanty, or excessive; and hence we must seek for an explanation in the cerebral functions themselves. Women are often to be met with who suffer from it at these times; and then the headache and sickness are both intense. The sympathy between the stomach and encephalon is so great, that a little rich food, or noise, or a shock, or fatigue, or exertion during the digestion of a meal will invite an attack. These people are naturally nervous, and in many instances it will be found on inquiry that the parents on one or both sides of the family have equally suffered; or insanity or nervous disease has carried off some members of it. They have perhaps led an anxious life from an early period of their career, and have taxed the intellect inordinately, when the growth of bone and muscle were most actively proceeding.

The patient who is eminently nervous asserts that her complaint is bilious; and although in such a case as that just referred to, sickness begins immediately with the pain, it proves no more than this, that the extreme susceptibility of the cranial nerves responded to the impression made upon the gastric nerves by the food that was taken. Not, however, that the act of digestion is necessary to originate the pain; for too long fasting or a continued train of unhappy thoughts will invite it. In a patient, aged thirty-nine, who consults me from time to time, the pain begins as frequently in the left temple as in the right,

and as often in the occiput as in either of these places. This sympathetic headache comes on simultaneously with the catamenia, although the function is regular. It is excited by ovarian irritation, and differs in no respect from the nervous form except that there is a greater chance of cure in these cases than in those we may designate as idiopathic; as with the cessation of the catamenia some physiological change may take place in the constitution which modifies the whole functions of life, and the head is no longer excited to morbid action.

Within the muscular walls of the uterus are imbedded numerous sympathetic ganglia, acting as originators of evil, alone or in concert with the cerebro-spinal system. When, from the periodic nature of the menstrual functions, more blood is determined to the uterus than in the intervals when vascular energy is less marked, there is at the same time a greater evolution of nerve-force, which involves it in irritation, and from thence the irritation is conveyed to the sympathetic filaments which accompany the bloodvessels of the brain. When these headaches are threatening, the sympathetic nerve is engaged in regulating the supply of blood to the uterus, and its influence is exerted in increasing or lessening the amount of secretion. The patient, too, feels cold and shivering, as is the case during the cold stage of intermittents, and there is a diminished supply of blood to the surface; the secretions are scanty, the pulse feeble, and the extremities are cold. These are striking manifestations of those conditions of headache over which the sympathetic system presides, uniting distant organs in their sympathies, acting as the conductors of impressions, and giving rise to the sensation of pain, either alone or through the medium

of the cerebro-spinal nerve-fibres, which are closely united together in all parts of the body.

The lectures delivered by Dr. E. Brown-Séquard* a few years ago throw much light on this interesting subject. Professor Bernard found, from experiments he performed in 1851, that, when the cervical sympathetic nerve was divided, a considerable afflux of blood in the head took place in those parts beyond the point of section of the sympathetic.

Dr. Brown-Séquard (who afterwards repeated the same experiments with like results) attributed this to the influence of the nerves on the walls of the bloodvessels, the latter becoming paralyzed after section of the sympathetic. He moreover found, as he anticipated, by another experiment, that galvanization of the nerve led to the opposite effect, the bloodvessels contracting and the temperature and the blood in the vessels diminishing. Apart from any knowledge of Brown-Séquard's discovery, Professor Bernard soon afterwards announced that he had seen galvanization of the sympathetic nerve have precisely the same effect; and this was corroborated by the researches of some British physiologists; so that it came to be acknowledged by different investigators that, whilst galvanization of the sympathetic led to the contraction of the bloodvessels, section of the same nerve produced the reverse effects.

Dr. Brown-Séquard sums up the phenomena briefly under the following heads:

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* On the Physiology and Pathology of the Central Nervous System, Lancet, Lecture IX, vol. ii, p. 441, October 30th, 1858.

Section of the Nerves.	Galvanization of the Nerve.
1. Dilatation of bloodvessels.	1. Contraction of bloodvessels.
2. Afflux of blood.	2. Diminution of blood.
3. Increase of vital properties.	3. Decrease of vital properties.

Dilatation of the bloodvessels, after section of the nerve, necessarily increases the quantity of blood passing through these vessels in a given time, and produces an excessive amount of cerebral congestion. "The hanging down of an animal, by holding it by its hind-legs, in producing a congestion in the head, produces very nearly all the effects of this section."*

From these experiments it is apparent that the action of the sympathetic nerve exerts an extraordinary regulating effect on the condition of the bloodvessels of the brain, and through them regenerates or impairs the properties of the nervous matter.

"However, we are ready to acknowledge that there are other causes of active circulation in the head, after the section of the cervical sympathetic, besides the paralysis of the bloodvessels. The very fact that there is more blood, producing an increase in nutrition and secretion,—a fact which depends chiefly, as we have said, upon the paralysis of bloodvessels,—produces an increase in the normal *suction power* of the capillaries. In other words, the greater afflux of arterial blood is itself, through the increased chemical changes of nutrition and secretion, a cause of attraction of arterial blood. To this cause another one of the same kind ought to be added: it is, that as there is more blood the temperature is increased, and

* Sur les Effets de la Section et de la Galvanisation du Grand Sympathique, Paris, 1854.

as the temperature is augmented the chemical changes, which are a cause of attraction of blood, are also augmented. From this statement it may be concluded that the primitive, and, I may say, by far the principal, cause of augmentation in the afflux of blood is the absence of contraction of the bloodvessels, which allows this liquid to pass easier there than elsewhere."*

In any other persons who suffer from a sympathetic nervous headache, the pain is of a continual shooting character, as though a nail was being driven into the head. It is neuralgic, following the course of a particular nerve or branch till it locates itself in the centre of the nervous system. It is more severe in the morning and evening than during the rest of the day, and the sight is confused and dim. The pain may commence over one ear, shoot up to the top of the head, and then extend backwards to the occiput. The pain is sometimes of a smarting character, and is attended with a sinking sensation in the stomach. Any stimulant, as a little beer or wine in the middle of the day, will bring it on. Although worry, hard work, and continual anxiety invite these headaches, the patient is not necessarily fidgety or irritable, and the attacks are unattended with sickness. A patient, who suffered in the way I have described, said: "I have two sons at sea, and if I could get over the idea that I should not see them again, I am sure I should not suffer so frequently." When with this anxiety of mind the catamenia are too active, we have the best instance of sympathetic nervous headache. The patient, being sleepless and unable to obtain rest,

* On the Physiology and Pathology of the Central Nervous System, Lancet, Lecture IX, vol. ii, p. 442, October 30th, 1858.

will pace the room all night, and tell you that her senses are departing.

Anomalous sensations in the head, of various kinds, are complained of by some persons.

An unmarried woman, thirty-three years of age, who was under my care in June, 1876, with a sympathetic nervous headache, felt on lying down a noise in her head like the ticking of a watch, which she never experienced at any other time. It sometimes seized one temple, and then the other; sometimes it fixed itself in the forehead, and sometimes it was seated over one ear (clavus); there was also the sensation of a heavy weight at the back of her eyes, but there was no actual pain. The patient had been subject to bilious headaches since she was a child, and the attacks, until a few years ago, always ended in the bringing up of bile. Formerly, the headaches came on at every catamenial period, and now they do not happen oftener than once in three months. The tongue is furred, and there is some flatulence after meals; but there is no uterine ulceration or leucorrhœal discharge worth mentioning. Nothing is clearer than that this case owed its origin to ovarian irritation; but it is inexplicable why the pain should now recur only once in three months, instead of at each catamenial period. The patient derived great relief from the bromides of potassium and ammonium, and for a time lost the ticking sensation altogether; but when she was overfatigued, immediately she laid her head on the pillow, there was a buzzing sensation in the ears, and if she looked upwards she was giddy. When there was pain at the back of the head there was always giddiness, and a queer sensation which she was unable to define.

Here is another case in which ovarian irritation and uterine loss have produced a sympathetic headache, and I give it as an illustration of a group of cases which are of common occurrence. The patient, E. S., thirty-one years of age, thin and pallid, who has had one child, suffers from an excess of catamenial loss. Her headache has now been continuous and severe for six weeks, but she has suffered more or less since she was fourteen, and dates the commencement of it from the time when the catamenia first appeared. This has always been frequent and excessive in quantity, and she is scarcely free from a headache, when the return of the catamenia brings it on again. Between the periods there is a great deal of leucorrhœa and pain in the back. The pain begins with the period, in the pit of the stomach (solar plexus), with the sensation of a heavy and oppressive weight, which is speedily followed by headache (generally in the left temple and side of the head), as though something was being driven into it. If it lasts long the pain extends over the whole head, particularly the occiput, which she constantly throws back against the spine, or on one side to obtain ease. When the pain is severe, she is always sick and deaf, and there are noises in the ears like the roar of the sea or the sound of a distant howling wind. At the time of these headaches the bowels are obstinately costive, and she cannot get relief until they have acted; the pulse is weak, and the hands and feet are cold. When the pain is coming on, the pupils are contracted and sensibility is increased, the head is hot and flushed, and the bowels are not free. When they are, and no food has been swallowed for some time, her face is as pallid as marble.

It can scarcely be contended that these cases were not due to uterine and ovarian irritation. In one case we have seen that no headache was complained of till the menstrual period was established, and from that time it recurred periodically. In the last case to which I have referred, the patient had filled a hard and worrying situation for years, and the catamenial losses were always considerable; so that the continuance of two depressing causes fully accounted for the general tone of the nervous system being lowered, and for a predisposition to headache.

But it is doubtful whether any excitement or disturbance of the uterine functions would solely produce these headaches unless the nerves of the brain were morbidly irritable, for I have known the general health greatly reduced by losses of blood, and menorrhagia persist till the quality of the discharge became almost colorless, and the patient blanched, without any headache supervening.

Many diseases have a tendency to spread and extend from one part to another. Whether the duodenum or any other portion of the intestinal tract is the seat of offensive and irritating secretions, or whether the uterus and ovaries are morbidly sensitive, the local disturbance is exceedingly prone to increase, and involve contiguous and even remote organs in derangement. Irritation arising from these and similar sources, travels by the sympathetic to the brain.

In cases of true sympathetic headache the susceptibility to pain is far greater from some causes than it is from others, according to the state of the patient's health at the time the attack is provoked. If a person subject to headache sits down exhausted to his dinner, he will prob-

ably pay the penalty of an attack for taking into his stomach a meal when the gastric nerves are oversensitive, and the secretion from its walls, instead of being clear and acid, is tenacious and alkaline. But in another person such remote irritation may not have this effect; whilst exposure to cold or the strong light of a theatre would bring on an attack at once.

"A typical specimen of sympathetic headache is presented in that form, more than once adverted to, which supervenes on taking ice into the stomach. Within an hour or two, sometimes sooner, pain will come on in the supraorbital ridge of the temple, attack the eye, dip down into the upper jaw, or extend itself over one lateral half of the head, acquiring the violence of a tic douloureux. The origin of this pain proves unquestionably how an impression may be made on the nerves of a distant organ, which, without producing any immediate inconvenience in that part, is conveyed to distant organs, and lights upon some particular set of nerves ready to take offence from such a cause, but which have shown their sensibility to disturbing causes in no other manner."*

Occipital Headache.—It is a question of the gravest importance in ascertaining the cause of headache to trace the connection and distribution of the affected nerves. How many persons give us a clue to the nature of their pain by fixing upon the nerve from which it springs! Headache, with deepseated mischief going on within the head, may involve the third nerve at its orgin, and produces such changes of the globe and eyelids as to enable us to recognize with certainty the exact seat of the lesion.

* Symonds on Headache.

As the pain of headache is referred to the forehead, the temples, or to one side of the head, the fifth nerve may be taken as a tolerably accurate indication of the cause of the pain; so that, when there is pain at the back of the head, it must be often due to an affection of the cervical nerves and their branches. "Thus pain in the anterior part of the head would suggest that the cause must be somewhere in the area of the distribution of the other portions of the fifth nerve. So if the pain be expressed behind, the cause must as assuredly be connected with the great or small occipital nerve, and in all probability depends on disease of the spine between the first and second cervical vertebræ."* This is exactly the opinion we might expect to receive from a surgeon; for the pain at the back of the head is not of common occurrence in the pure forms of idiopathic headache. When the nervous system has become exhausted, and the patient is low and depressed, the occipital region is more frequently affected; hence it is common in some cases of nervous headache. It is not to be included as a symptom among the cases that ordinarily present themselves for advice. Persons,

* Lectures on Pain and the Therapeutic Influence of Mechanical and Physiological Rest, by John Hilton, Esq., F.R.S., in The Lancet, vol. ii, 1860, p. 303.

As corroborative of the opinion of Mr. Hilton that pain at the back of the head is sometimes owing to organic disease, I may briefly mention the case of a consumptive patient who came under my care in 1869. He suffered from the most excruciating pain at the back of his head, which he could not move for weeks together. About two months before his death the pain abated, and he then mentioned to me that his neck made a grating noise when he slightly rotated his head, which he could now do without causing any pain. After death the first and second cervical vertebræ were found carious.

however, may experience periodic nervous headache for upwards of twenty years, and the pain on no occasion extend behind. When pain is present in this locality, it will be found to follow the track of the cervical nerves; and the neck, from the first to the last cervical vertebra, is often tender and stiff. The pain extends over the scalp at the back of the head, in the direction of the occipital nerves and the free anastomoses which take place between it and the auricular and temporal branches of the fifth nerve. Now, I am of opinion that, when the occiput is the seat of pain in headache, it may be considered to arise from an affection of the cervical nerves and their occipital branches, if the pain is superficial and the nervous sensibility is increased; but pain in the back of the head, as we have seen, may be owing to disease of the spine, though I apprehend that it can over and over again be ascribed to no other cause than a hyperæmic state of the vessels at the posterior or under surface of the brain (or of the cerebellum itself), where the veins and sinuses are also too full of blood, and the nervous matter is deranged in consequence.

Occipital pain is sometimes present in the headache of acute congestion, and the patient will even cry out on any attempt being made to move him or examine the seat of suffering. In the case of a gentleman, aged twenty-eight, who came under my care in December, 1876, the pain was described as like the beating of a hammer, over the greater portion of the head, which was hot. The pain at the occiput was deepseated, and limited to the region of the cerebellum; the muscles of the neck were also stiff, and the patient could not rotate his head in the smallest degree. The chief additional symptoms were constipa-

tion of the bowels, slight elevation of temperature, incessant vomiting, and a large, slow, and laboring pulse, not exceeding fifty-two beats per minute. I found free purgation by calomel, and an open blister at the back of the neck, over the upper cervical vertebræ, gave much relief. The first symptoms of improvement were a more frequent and natural pulse, and the heavy, throbbing, deepseated pain changing its character, and becoming paroxysmal in the course of the right temporal and supraorbital branches of the fifth nerve.

CHAPTER IV.

DYSPEPTIC OR BILIOUS HEADACHE.

Nature and Origin of—Effect of Sympathetic Action in provoking Cerebral Disturbance—Functions of Pneumogastric and Ganglionic Nerves—Relation of Vascular Excitement to Nervous Exhaustion—Effects of Aperient Medicines—Stimulating Drinks and Suppers—Use of Emetics in cutting short the Paroxysm—Alteratives—Alkalies—The Mineral Acids—Quinine—Aconite—Pepsin.

THIS is also termed *Sympathetic* or *Sick Headache* by some authorities, and I think rightly so, because vomiting often dispels the pain like magic, the source of irritation being so removed. No headache, however, ought to be termed *bilious*, unless there is so copious a secretion of bile that it either accumulates in the duodenum or regurgitates into the stomach, or the skin is yellow from its absorption into the blood. Dyspeptic headache has its origin in imperfect digestion, and arises either in the stomach or duodenum from the irritating and disturbing of the nervous apparatus of the alimentary canal by the resulting depraved secretion. Indigestion impresses itself on the sensorium by sympathetic action, and originates pain in it; but, though this arises in a few persons only, and not in all whose habits are irregular in eating and drinking, it must still be accepted that there is a tendency on the part of the nervous centres in the brain

to be so impressed. A morbid impression conveyed through the sympathetic nerve to the brain would excite disturbance, and act as an agent of transmission.

All the processes of life must be carried on evenly and orderly to insure health. The circulation cannot continue with regularity unless digestion and respiration accord with it; the one is dependent on the other, and the nervous connections of the viscera, if arrested or deranged, propagate the disturbing element to the cerebro-spinal system, through the ganglionic nerves. Thus the unity of the whole is apparent through the intimacy of the physiological relationships; and when we consider for a moment how the action of the heart is disturbed in its functions by derangement of the sympathetic system, it shows clearly how inflammatory or other states may originate disturbance, and produce painful sensations in a distant organ.

The facts which are proved concerning the functions of the par vagum do not warrant the drawing of any exact or precise conclusions from them. What we have to say, then, in reference to the part it plays in the digestive process must be to a great extent uncertain and problematical. It consists of a motor and a sensory tract, closely united together at their origin in the brain, the one tract being destined for voluntary, and the other for involuntary motion and sensation. This gives it a wider range of action, and its disturbance is manifested by a variety of peculiar sensations, from severe pain on the one hand to exalted sensibility on the other. Excitation of any sensory branch of this compound nerve, after having reached the nervous centre, may be reflected to any part of the periphery, or even to some part in connection with it. So

closely, then, is one part of this nerve associated with other parts, that irritation experienced in any single branch may be conveyed along it, and felt in the most distant portion of the nerve's periphery. This kind of irritation, set up by some change or alteration in the trunk or periphery of the various sensitive nerves, is analogous to those cases of reflex paralysis mentioned by Dr. Brown-Séquard. Many paralytic affections (and especially paraplegia) are due, not to disease of the spinal cord or its membranes, but simply to reflex irritation, starting from a sensory nerve or its branches, which have been irritated or excited; and thus we have cases recorded of paraplegia from the cutting of a molar tooth during the second dentition (West, Kennedy, Brown-Séquard), from enlargement and displacement of the uterus, or from ovarian excitement; in hysterical paraplegia, stricture of the urethra, and intestinal worms. These morbid states must take place through the medium of the nervous system, and not through the general circulation, or the paralysis would extend upwards. A case of paralysis of the lower limbs, due to synovitis, from the extension of irritation in the left knee-joint, is described by Brown-Séquard.* Now, all these cases are caused by the excitation of an afferent nerve, and the reflex paralysis continues so long as the excitation persists. The morbid effect on the muscles is of a transient character, unlike the spasms, twitching, and anæsthesia which accompany the paraplegia of myelitis, where all parts are involved, and the tendency of the disease is towards a fatal termination. Mr. Hilton has also recorded the case of a boy who was lame in his right leg,

* Paralysis of the Lower Extremities, by C. E. Brown-Séquard, M.D., F.R.S., 1861, page 18.

and could neither put it to the ground nor control its movements, yet the real pathological cause was seated in the brain, and not in the limb; the paralysis, in fact, being nothing more or less than a sympathetic disorder occasioned by the febrile state. Mr. Hilton has also shown how the exact seat of disease in the hip-joint may be indicated by the spot on the knee where the pain is experienced.

The pneumogastric is no exception to this rule, and irritation in the stomach will often occasion a cough—the well-known stomach cough. Sir Thomas Watson relates the case of an epileptic, whose fits ceased with the expulsion of a tapeworm. "I know that a physician of my acquaintance cured a case of epilepsy in this way, somewhat to his own surprise. Without having in his mind any notion of worms, he thought it might be well to purge his patient, who had labored under epilepsy for some time, with the oleum terebinthinæ. The patient, who is the brother of a person holding at present a high office in this country, was residing two or three miles out of town. In the middle of the night the doctor was summoned to him in a great hurry; the messenger said he was supposed to be dying. He was only intoxicated, however, by the free dose of turpentine that he had swallowed; the next morning he voided into the close stool a large tapeworm, and he has never had epilepsy since. A nobleman residing in Cambridgeshire was long epileptic, and he too got rid of his epilepsy and of a worm at the same time."* Irritation, then, at a portion of the periphery of the pneumogastric may produce either centric or pe-

* Principles and Practice of Physic (4th edition), vol. i, page 663.

ripheral manifestations. The headache of dyspepsia thus becomes intelligible. Seeing that the nerves of the stomach are derived from the pneumogastric and the sympathetic, we are in a position to understand the immense influence they must exert on the secretions of this viscus. The branches of the pneumogastric, after perforating the muscular coat, ramify in the submucous areolar tissue, until they are lost under the surface of the mucous membrane. "Each unites, not only with large and small branches of its fellow, but with the sympathetic nerves of the stomach, at all stages of their distribution visible to the naked eye—from the solar plexus and semilunar ganglia to the secondary and tertiary offshoots of those around the vessels, and even to their branches in the areolar coat of the stomach."* The distribution of the sympathetic branches is much the same, and, after perforating the muscular coat, the plexuses disappear in the submucous tissue, like the gastric branches of the par vagum. The pneumogastric gives off branches which have been traced into the plexus mesentericus, and so brought in contact with the intestines. Any irritation, then, of the stomach and intestines may produce headache by sympathetic disturbance.

The influence which the pneumogastric nerve exerts on the action and secretions of the stomach is both interesting and important, and the subject may well be considered in this place. The extensive distribution of the par vagum, and its intimate connection with the sympathetic system, gives it a wide and diversified action; it changes local into general influences, and possesses relations which involve distant organs in excitement and

* Brinton, On Diseases of the Stomach, 1864, p. 24.

morbid change. The pneumogastric nerve, both physiologically and pathologically, is never lost sight of in any organic or functional disorder, and least of all should it be so in an affection like headache, when its communication with the brain and stomach is so closely united, and the derangement of all parts which it supplies becomes evident in the painful sensations we experience when it is irritated or inflamed.

The mucous membrane of the stomach in a healthy condition is of a pale color when at rest, but immediately an irritant, in the shape of food, comes in contact with it, the mechanical action induced by the friction and motion causes the vessels to dilate, and the surface to become red. The thin, acid, transparent, gastric secretion is poured out even after the nervous supply is cut off from without, though it is largely concerned in the secretion, as we shall see in considering the action of the pneumogastric nerve on the walls of the stomach itself. During fasting, when the stomach is at rest, there is another secretion furnished by its walls, which is thick, ropy, and alkaline. The various stimulants, as ether, alcohol, wine and spirits, mustard, and a host of other excitants, cause the gastric juice to issue forth in abundance and to perform a necessary part in the digestive process. Irritation of the afferent sensory fibres causes the gastric vessels to dilate, and the mucous membrane to become reddened, whilst Bernard found that section of the vagi caused pallor of the surface; but it would appear "that the vagus contains two sets of afferent fibres, one of which increases, whilst the other diminishes, the degree of contraction of the gastric vessels."*

* See The Action of the Vagus on the Stomach, by Dr. Lauder

The close connection of the par vagum with the sympathetic nerve of the abdomen, uterus, and ovary, induces reflex irritation in the stomach, which is so commonly observed in affections of these organs—as dysmenorrhœa, ovaritis, and uterine contraction. When the nerve is divided or injured, any of the parts to which it is supplied may be affected, as violent or spasmodic action, retarded motion of the heart, or congestion or inflammation. Irritation of the gastric branches induces vomiting, but section arrests it, and causes distension of the viscus.

As the par vagum is in immediate relationship with the chief cerebral nerves (the glosso-pharyngeal, the fifth, the seventh, the third, the ninth, and spinal accessory), we may in a great measure realize how its sympathetic disturbance may involve organs which own a different nerve-supply, and are only brought into relation with it through nerve inosculations. The union of the par vagum, therefore, with other nerves may set up far away reflex irritation, as we have seen, but more particularly with the fifth, and with that state of irritability and supraorbital pain which we have seen to follow the introduction of ice into the stomach.†

The alliance of the par vagum with the ganglionic supply to the stomach enables us to judge of their continued effects upon the pulse and cardiac circulation; in many acute diseases the cardiac plexus and the solar plexus are brought into close and immediate sympathy, which is inseparable between them. The diseases of the stomach

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Brunton, in Handbook for the Physiological Laboratory (Text 1873), page 493.

† See Chapter III, on Sympathetic Headache.

and abdominal viscera produce their full share in prostrating the vital powers, rendering the pulse imperceptible, and causing coldness of the surface and syncope. No better illustration can be found than the effect which a disturbed stomach or a severe bilious attack has on the cardiac circulation, when the nervous power is exhausted and the vessels are weak and dilated. Hence it is that the healthy action of this nerve is essential for the steady performance of the digestive process; and, when digestion fails, the nerve-power will frequently be found at fault. If the strength of the constitution has been reduced from prolonged indulgence in alcoholic stimulants, the nervous energy is the more exhausted, and as the patient cannot assimilate sufficient food to keep the functions of life going steadily, the way is paved for chronic dyspepsia and degenerative changes.

The secretion of gastric juice is effected by the state of the nervous system, and sudden mental emotion is able to stop it altogether. The channel by which this is conveyed clears up any doubt or mystery attaching to the phenomena; for the division of the trunk of the pneumogastric controls the secretion of gastric juice and the movements of the stomach. Though the experiments of physiologists like Reid, Schiff, Budge, Longet, Bernard, Ravitsch, etc., show that the stomach gradually recovers its lost tone after division of the par vagum, the functions of absorption and assimilation are enfeebled for a considerable length of time. The division of the sympathetic nerves, also, does not arrest the functions of this organ. But continued disorder of one or other, or of both these nerves, apart from any experimental deduction, proves, I think, to demonstration, that when pain is sud-

denly experienced at the pit of the stomach from the reception of bad news, they are so affected as to exert a most important influence on the digestive apparatus. The failure of nervous power is obvious enough in the fearful gastralgia and feeble digestion that render the life of some people a burden, and I do not think that even the division of the par vagum at the œsophageal opening or of the splanchnics in the abdomen of the lower animals without palpable and permanent effect on the digestive powers, justifies us in setting at nought the agency of the nervous system in man, and still more the importance of the pneumogastric in the production of reflex phenomena.

A genuine bilious headache is less common among women than men, who commit greater excesses in eating and drinking. Young people of both sexes are, however, liable to it. The pain comes on in the morning after a heavy meal the night before, or after drinking too much wine; or it succeeds a heavy midday meal, if the person is not accustomed to it; or if the food is hurriedly eaten, and exertion and fatigue follow it. The pain occupies the whole forehead and top of the head, which feel hot and sometimes burning. The face is flushed, and the temporal arteries throb. A heated room, or stooping, brings on extreme nausea, and aggravates the suffering. If the patient avoid taking food he may manage to get through the business of the day, but when evening arrives if he attempts to eat the pallid face is exchanged for one of vascular excitement, and the throbbing headache often culminates in a violent attack of vomiting, after which, when the hope of alleviation has departed, he suddenly and unexpectedly falls asleep and awakes next morning

well. An attack of severe retching, with or without the discharge of frothy mucus and bile from the stomach, will sometimes remove the fit of suffering. Its duration varies from a few hours to three or four days. In some patients it frequently continues a week, and the first sign of amendment is a desire for food with the power to digest it. After the long continuance of severe gastric headaches, the vascular excitement gives place to nervous exhaustion, and as they become more frequent, the nervous element preponderates, so that with the advance of years the bilious character and the vomiting are exchanged for the type of headache which we shall presently describe. But one form of headache during its continuance may partake of the character of several types. That which begins as a purely bilious may end as a nervous headache, and that which begins as a nervous may terminate as a bilious headache, so great is the sympathy between the stomach and the brain. Where the urine is turbid and high-colored, and the complexion sallow, the cause may be traced in many instances to an accumulation of bile in the duodenum or the blood, and a fit of vomiting will sometimes cause a large quantity to be ejected by the stomach.

Whatever the exact cause and nature of the headache may be, the nervous system has largely to do with it, inasmuch as some persons of the most irregular habits, with defective depurative organs, never have the sensation of a headache. I once knew a gentleman who was a martyr to gout, and had attacks which confined him to bed for six weeks at a time, and whose secretions were much deranged, as was shown by the dark bilious character of the evacuations, high-colored urine, and foul

tongue; yet this patient, who freely indulged in the pleasures of the table, and drank largely of wine, never within his knowledge felt the sensation of a headache. He was, however, one of the most nervously timid persons I ever met with, shunning the society of ordinary visitors, and at times he could not summon up sufficient courage to meet his oldest friends.

Causes.—The habit of continually taking aperient medicines by which the powers of digestion are enfeebled, indulgence in indigestible food and stimulating drinks, are common causes of this headache. A glass of beer, or a tablespoonful of brandy, will bring it on at any time in those persons who are predisposed to it, and where the digestive organs are easily deranged. Suppers, if persons are not accustomed to them, will cause disturbed sleep, followed by heat of the head, extreme nausea, and headache on awaking. Some of the worst forms of this headache have followed the excitement of evening parties, and the overloading of the stomach with indigestible food. Unwholesome food, which temporarily disturbs or arrests digestion, will occasion acute dyspepsia in some persons, and such persons are extremely prone to this form of headache; uneasiness at the stomach, faintness, depression of spirits, lassitude, and febrile excitement are to be reckoned among the prodromata. Then succeeds an oppressive frontal headache, with nausea and inability to face the light, or bear the slightest noise. In some persons vomiting ensues, and the patient finds immediate relief; and in others colicky pains and diarrhœa expel the irritating matters from the intestines, and the patient loses the headache more gradually; weight about the præcordia, dislike of food, high-colored urine, offen-

sive evacuations, and a creamy fur on the tongue may remain for days after, during which the nervous system is more or less implicated, and confusion of ideas and vertigo, with a return of throbbing headache, follow any employment of the mind requiring thought and reflection. This headache may come on in a few hours after food, or the patient may go to bed comfortably, and either have disturbed and restless sleep, or wake up unrefreshed with a weight across the forehead, and forthwith the affection begins in earnest. A sense of cold and chilliness is felt about the scalp and face for a few hours, particularly if nothing is put into the stomach; but if such be the case, or as the day advances, the face becomes hot and flushed, and the patient is continually employed in applying cold wetted rags to the head for relief.

"The headache which appears in the course of the slighter attacks of this nature, often assumes a form with somewhat characteristic features, and which is familiarly known as the '*sick headache*.' It is most common when acute exacerbations are superadded to the ordinary forms of atonic dyspepsia; and hence it is most liable to affect those who are out of health, and whose digestions are weakened by sedentary employment, and who have a tendency to costiveness. It occurs, however, also in persons of apparently vigorous health, sometimes without apparent cause, but most usually after some indiscretion in diet, or after some of the causes most likely to arrest the digestive process."*

Treatment.—In early life, when this headache is threat-

* On Acute Gastric Catarrh, by Wilson Fox, M.D., F.R.S.; A System of Medicine, edited by J. Russell Reynolds, M.D., F.R.S., vol. ii, 1872, p. 869.

ening, it can always be traced to some error in diet, and an emetic of sulphate of zinc or ipecacuanha brings relief in a couple of hours (Form. 108–109); or one grain of calomel, or three grains of blue pill taken on an empty stomach will mitigate the suffering in the head, though it may increase the nausea and loathing of food. With the advance of years these headaches become less acute, but more exhausting and tedious in their recovery. Rest in bed, cold applications to the head, and an alterative pill, followed by an alkaline purge in the morning, suffice for their cure (Form. 81–19).

When patients are very bilious, and the conjunctivæ yellow, a good cholagogue purgative (Form. 79) will excite the action of the liver, and drain away a copious quantity of bile. A mixture of soda and bismuth with sal volatile will be useful to relieve flatulency and acidity (Form. 15). Where the bowels are irritable, a full dose of bismuth twice a day before meals is good (Form. 107). In the case of persons who are not strong, a few grains of carbonate of ammonia in water (Form. 16), or sal volatile, and chloric ether will sometimes arrest the symptoms at once (Form. 17).

If the headache is accompanied with atonic dyspepsia, and there is a clean tongue with weight and oppression at the epigastrium, the nitro-muriatic acid will be found serviceable before meals twice or three times a day (Form. 48). If flatulence is very troublesome, bismuth with nux vomica, and if there is constipation, a morning pill of aloes, nux vomica, and belladonna, or one consisting of aloes, capsicum, quinine, and ipecacuanha are indicated (Form. 77–78). In some varieties of dyspeptic headache, Dr. Smith gives one minim of the tincture of

nux vomica every fifteen minutes for two or three hours, and he has found it most effectual. Where the extremities have been cold, and the pulse small and hard, a drop of tincture of aconite in a teaspoonful of water has fully answered my expectations in many instances. By dilating the vessels and favoring perspiration it has wonderfully relieved the aching brain. If the headache comes on soon after a meal from slowness of digestion, Dr. Smith gives half a drachm of saccharated pepsin in a wineglassful of sherry three times a day at meal-times.* I have given Morson's pepsin wine with great advantage at meals, and it certainly accelerates digestion and relieves nausea and gastric oppression.

* The Therapeutics of Headache, by A. A. Smith, M.D. A Lecture delivered at the Bellevue Hospital Medical College, in Medical Record, September 15th, 1876, p. 390.

CHAPTER V.

CONGESTIVE HEADACHE.

Physiological Distinctions between Congestion and Hyperæmia—Definition of the two States—True Congestive Headache is of a Passive Character—Seat of Pain and General Symptoms—Causes that invite Congestive Headache—Good Living—Sedentary Habits—Bronchitis—Asthma—Whooping-cough—Tight Stays and whatever impedes the Circulation—Treatment consists in lessening the Supply of Blood to the Brain when in excess, and promoting its Circulation through the Vessels when their Tonicity is impaired—Purgatives—Saline Waters—Occasional Advantage of Venesection—Spare Diet and Avoidance of Stimulants in the Active Form—Counter-irritation—Walking Exercise—Change of Air—Foreign Watering-places—Aconite—Bromides of Potassium and Ammonium—Strychnia—Nux Vomica—Mild Preparations of Iron in Anæmic Cases.

In the active variety this can scarcely be separated from the headache of active hyperæmia. It overlaps each of the other forms, active and passive hyperæmia; yet it is not absolutely either. Congestion seems rather to be a dilated condition of the minute vessels, arterioles, capillaries, and venules, owing probably to some modification of the textures of the brain, by which they attract more blood to themselves than they do in health. In active hyperæmia, or one form of it, the determination of blood is more sudden and energetic, and the symptoms violent for the time it lasts; the temperature is higher, and the pulse quicker and stronger. The patient feels

the whole arterial system throb and pulsate. As another and marked distinction from any form of congestion, the nervous centres are more susceptible, and this has a very determining influence on the vascular system, rousing the circulation more violently than in congestion, and increasing the functional activity of the affected part. Vital power and action are increased, with a less tendency to produce inflammation. It is a form of hyperæmia that does not lead to inflammation. The sensibility is heightened in proportion to the increased supply of blood.

Congestive headache occurs most frequently in plethoric persons, and those of a full habit of body; but it may happen to those who have a sluggish brain circulation, and in whom the vessels are habitually loaded. It is the form of headache that occurs at the commencement of febrile disorders, acute hydrocephalus, and threatening apoplexy; but in these latter cases it attracts less notice and consideration than the primary disease on which it depends, and is therefore to be considered as a secondary rather than as a primary affection. In its true signification it is a passive congestive form of headache, depending on fulness of the vessels of the brain, and there is no better example than that which follows an epileptic seizure. I have met with it in country people who lead an active life and are of regular habits. Bilious and lymphatic temperaments are liable to this affection; the face becomes bloated, the eyes heavy, and the conjunctivæ injected; the expression is heavy and sad, and the pulse full and soft, or weak, small, and accelerated. The symptoms are a dull and severe pain, extending from the forehead to the occiput, and great heaviness and stupor; the suffering is rather limited than general, and is some-

times referred to a particular part of the head, which indicates congestion of one lobe or hemisphere of the brain; the patient is apathetic and indifferent, and suffers from giddiness and noises in the ears. If he stoop or turn round quickly, he experiences the disagreeable sensation of vertigo; his walk is apt to be overcautious, and his nervous system is tremulous and susceptible. In persons who are advancing in life, hypochondriacal symptoms are of common occurrence, and the nights are restless and disturbed by frightful dreams. If the pain continues long, and does not yield to treatment, the patient loses strength, is depressed, and easily fatigued; the pulse is irregular in force and frequency, and there may be palpitation and shortness of breath. The appetite is generally good, and the tongue clean and red, but the bowels are disposed to be costive, and the urine turbid and high-colored. This form of headache is said by some writers to occur in irritable and anæmic subjects, but I cannot say that I have frequently observed it in this class of persons. When it does occur in these states of constitution, the pulse is weak and frequent; there are flashes of light before the eyes, the skin is pale, and the tongue generally clean and bloodless. Sometimes weakly persons suffer from a dull continuous headache, during which the heart's action is violent, and the carotid and temporal arteries throb; but if congestion of the vessels of the brain exist, pain comes on in paroxysms, from sudden noise or exertion, and is transitory in its duration. An oversensitive condition of the nerves, by causing a hyperæmic state of the vessels of the brain, analogous to the distension of the capillaries in blushing, may induce it.

The true headache of active congestion belongs to a general hyperæmic condition, and there is an excess of blood in the system, or it is propelled with an increased activity, which overexcites the cerebral tissues and causes pain. But in passive congestive headaches the circulation is at fault, and the tone of the system is deficient. Cases are often seen where the patient is nervous and weak, the expression heavy, and the face sallow and bloodless. The spirits are dejected, and the drooping eyes bespeak a sad and sorrowful condition of the mind. The blood is not propelled through the cerebral vessels with sufficient activity or force, in consequence of their imperfect contractility, and hence they become overloaded without any extra power to propel their contents onwards. In malarial poison, congestion of the brain is common, like that of the spleen and liver; the blood moves slowly, and the vessels are enlarged and distended in consequence of a loss of tone.

Cases of meningitis are recorded which prove that there is no necessary connection between the locality and degree of headache and the inflammatory lesion. Headache must therefore have an independent existence, and owe little to actual disorganization of structure. For organic change may cause congestion—a condition brought about by very opposite causes, as overexertion, mental distress, and debility of the vessels through which the blood is conveyed. Many cases of headache attributable to cerebral congestion can find no other explanation. Now, this congestion seems to be borne longer with impunity by a sensitive organ, like the brain, than by any other tissue, where it would lead to excess of secretion or alteration of structure. The functions of the brain are

altered (though it escapes injury), chiefly through functional disturbance of the nerves themselves, which may or may not produce an alteration in the vessels. The nerves in the form of headache are first involved, and any mental excitement will cause their disturbance; and as the bloodvessels are in close and intimate relation with them, the capillary circulation quickly responds, and produces a state of hyperæmia. Under any degree of emotion these headaches are common enough, and the flushing of the vessels of the face and neck indicates how they become overloaded under passion, or any kind of mental disturbance. The vehemence, again, of invective oratory, under a strain of deep thought and reasoning, excites the action of the heart, and forces the blood to the cerebral circulation, where it is detained, and keeps up the cerebral excitement. There are many persons (and it is especially so with nervous and irritable children) in whom intellectual exertion brings on a state of active congestion, which prevents them from following their work; and if it is persisted in, changes may then ensue in the vesicular structure of the brain, which permanently damage or impair it. I possess notes of cases of fatal congestion of the brain and meningitis in children after a few days' illness. In each instance the attacks were preceded by slight headache and sickness; but setting aside this significant symptom of brain mischief in early life, the other indications of failing health were too trivial to have given warning of the grave results to follow.

Causes.—The causes that invite congestive headache are a peculiar configuration of the body, such as when the chest is capacious, the shoulders high, and the neck short; or again when, as with many persons, there is a

general redness of the skin and lips. The patient experiences shortness of breath in going upstairs, and is distressed with exertion. He is fond of good diet and stimulating drinks, and prefers sleep and sedentary habits to active exertion and scanty fare. This headache in its active form is not unfrequently seen in young healthy women, whose catamenial losses have been suddenly suppressed through taking cold.* Whatever depresses the bodily powers and reduces the general strength, exhausts the system and induces debility of the vessels, favors congestion, and relaxes their tonicity and contractility. It is seen in both sexes when the constitution is broken down and shattered by indulgence, and in stout heavy persons, who have had attacks of bronchitis and asthma; in women who have borne large families, and whose nervous power is exhausted. During or after whooping-cough it is not uncommon when the attacks of spasm are violent, and the pulmonary complication is tedious and irksome. Persons who play the cornet, and other instruments requiring prolonged expiratory efforts, and the suspension of the breath for some seconds, are frequent sufferers. The now happily discarded stock worn by our soldiers a few years ago induced this variety of headache; and any constriction about the neck, or the use of tight stays to compress the figure into a fashionable shape, will bring about the same evil by impeding the circulation.

Organic change may induce it, by disturbing the relations of the structures of the brain, and causing congestion and interference with the circulation. Congestive headache of a passive character is exemplified in hyper-

* See Chapter VI, on Plethoric Headache.

trophy and valvular disease of the heart, where we may frequently witness lividity of the features, distension of the jugular veins, coldness of the skin, and fulness of the temporal vessels. In a little girl, aged ten years, who was under my care with this form of heart affection, the headache was nearly unceasing, and the poor child only got relief by a free purgative and the lightest diet. The brain was overloaded with blood from passive congestion, and the blood interrupted in its return by the condition of the heart. Indeed, it appears to me that it is impossible to dissociate congestion of the vessels from any form of headache in some stage of its progress. The purely nervous headache in many persons, at its commencement, or shortly after, exhibits signs of congestion in the frequency and fulness of the pulse, the warmth of surface, the heat of the head and scalp, the tendency to vomit, in constipation, and in a greater or less degree of paralysis of all the functions. As the circulation of the brain is active, and the amount of blood within it is at all times great, even in health, we may reason from analogy that the nerves are exceedingly liable to disturbance in those who are subject to headache, because it is possible, and not uncommon, for persons to have habitually a congested and sluggish circulation through the brain and other cavities of the body, without experiencing the sensation of a headache.

Repeated epileptic seizures will also induce severe congestive headache. The headache which happens to the intemperate and those addicted to irregular habits is of the congestive and hyperæmic variety. The vessels of the brain are overloaded by the entrance of alcohol into the blood; there is congestion of the stomach and of the

liver also, these latter organs being first in fault. A hyperæmic condition of the arteries of the brain, arising from a diminution in the tonicity of the vessels, and causing severe headache, is not uncommon in those persons who exhaust the brain by prolonged study, and excessive intellectual exertion. The brain is fagged, and never rested long enough for the vessels to recover their tone and vigor. Men of the strongest intellect and the most placid natures, when afflicted with this headache, become dejected and irritable, and exhibit traits of character which they have not previously shown, and a difficulty is felt in concentrating the mind on work; while the patient, if accustomed to walk vigorously, now finds that short distances tire him. He first has an uncomfortable feeling of pressure along the front and top of his head—an uneasy sensation, similar to what is felt from extreme heat or cold. Later on, the headache is characterized by a heavy pain across the frontal region, dull and continuous. This is often succeeded by faintness and inability to walk. When talking, there is a sensation of weight over the brain, and numbness of the scalp. In short, the brain is being worn out; and if this continues, there is certainty of the patient sooner or later breaking down altogether. Long-continued anxiety and the struggles of professional life, hopes disappointed and plans frustrated, will induce a state of congestion or hyperæmia of the brain and headache, which may become permanent, if the warning is not taken in time; for when the brain is constantly overcharged with blood, changes in the vesicular structure of the nervous matter are not unlikely to occur, which sometimes end in weakness of intellect.

Treatment.—In managing this variety of headache, the

local as well as the constitutional symptoms must be carefully estimated. It will be necessary to inquire into the condition of the capillaries of the brain, and whether the blood is impeded in its passage through the circuitous veins and sinuses of the cranium. The age of the patient and the habits of his life will also demand careful consideration, before we can submit him to treatment with any prospect of relief. In the plethoric and robust, the quantity of blood circulating through the brain may be lessened by exciting the action of the secreting organs. A full dose of calomel and colocynth should be given at bedtime occasionally and a saline aperient during the day (Form. 80). A tumblerful of Apollinaris water, on going to bed, will stimulate the bowels to act more freely on the following morning, and cool and refresh the system. About twice a week, according to the circumstances of the case, two-thirds of a tumblerful of Friedrichshalle water, in a little lukewarm water, taken on rising, will prove a mild and efficient purgative, and it answers exceedingly well in these cases.

The diet should be spare, and beer and spirits abandoned. Active exercise in the fresh air, and habits of early rising should be enforced; and these measures, when rigorously carried out, afford the best promise of relief.

Bloodletting, either general or local, is rarely if ever needed; it being preferable to trust to abstinence, mild or active exercise in the open air, and due attention to the action of the liver and bowels. In the case of young plethoric women I have known leeching the temples or groin prove advantageous. There are instances occasionally to be met with, however, where the patient is indo-

lent and overfed, besides being too full of blood already. He is about the middle period of life, and is much averse to exertion or active employment of any kind. His habits of life having become more sedentary, it happens probably that the bowels no longer act so freely, the liver being habitually congested, and the circulation through it to some extent obstructed. Cases of this character may possibly be benefited by the abstraction of blood, but even here brisk cathartic and alterative medicines are most to be relied on (Form. 79–80–29). In one case that came under my notice, much benefit was derived from an open blister at the back of the neck; but no measures will be availing unless the diet is restricted, and exercise is regularly taken in the open air.

In some cases of acute congestive headache, where the face is hot and flushed, the pulse firm, and the skin dry, the antiphlogistic effects of aconite prove of signal service, by inducing diaphoresis, and relaxing or partially paralyzing the vasomotor system (Form. 26 *a*). Aconite depresses the heart's action, and by reducing arterial excitement, and diminishing pressure and tension in the vessels, it controls the amount of blood which circulates through the cerebral mass. The patient should lay his head on a hard and elevated pillow, and either the ice-cap, or some other means of producing cold, should be continually applied to it, till the pain becomes less severe.

When this headache is the result of overwork of the brain and prolonged study, change of place and scene will be desirable. The mind must have entire relaxation by easy travelling and the quiet amusements of the sea-side. Foreign watering-places, where the air is pure and

the waters are adapted to promote the digestive functions, will amply compensate for a long visit.

It is in such cases as these, and especially in nervous and irritable subjects, that the bromides of potassium and ammonium are of such signal value. If the patient is sleepless at night, the bromide of potassium will be of great service if taken just before going to bed (Form. 40); and if he is unsteady on rising in the morning, and dreads the fatigue and business of the day that is before him, the bromide of ammonium (Form. 25) will avert the headache which threatens with the morning light, and steady his nervous system in a remarkable way. In the case of a gentleman who suffers periodically from a subacute congestive headache, and who is also troubled at these times with flatulent dyspepsia, a full dose of the subcarbonate of bismuth in plain water twice a day, before the two chief meals, always controls the headache and general discomfort and flushing of the face (Form. 107).

When tonics are required, bark and ammonia, or ammonia and lavender, may be first ventured on (Form. 55–62), and in some cases they answer well. The mild preparations of iron are suitable if the patient is weak and anæmic (Form. 22–24), but they must be cautiously given in the intervals between the attacks, and the functions of digestion and assimilation should always claim a large share of attention during their administration.

CHAPTER VI.

HEADACHE FROM PLETHORA AND INCREASED VASCULAR ACTION.

Characters and Composition of the Blood in Plethoric States of the Constitution—Predisposing and Exciting Causes—Variability of the Symptoms according as the Disorder is of a Sthenic or an Asthenic Type—Prevalence of the Headaches at the Catamenial Periods and during Pregnancy.

Treatment—Natural Cure by Spontaneous Hæmorrhage from the Bowels, Nose, or Uterus—Occasional Necessity for Venesection and Cupping or Leeching in Active Plethora—Saline Aperients to Excite the Eliminative Organs—Importance of Abstemious Habits and a Limited Indulgence in Animal Food—Fish and Vegetables, and the Influence of Diet on the Composition of the Blood.

In this variety of headache there is an excess of blood in the whole system, and throughout every organ of the body. It is allied to the congestive form; but here there is an increased quantity of blood in the brain, without any corresponding repletion of the rest of the vessels of the body. The condition is essentially dependent on the cerebral vessels partaking of the general fulness, and is not due to the determination of blood towards the head in particular. The redundancy of blood in the brain excites morbid action of the nerves and causes headache, whilst the general plethoric state leads to indolence and insufficient exercise; and with defective action of the skin,

liver, and bowels, the fulness of the vessels is continually kept up. When the capillaries are too full they favor congestion, by the exudation of their contents through their thin membranous walls.*

The predisposing causes are overindulgence of every kind, stimulating foods and drinks, want of regular exercise, and mental lethargy. Among the exciting causes may be enumerated any circumstances that determine blood to the brain and internal organs. The suppression of any accustomed discharge, as epistaxis or hæmorrhoids, will induce it. I knew a lady, forty years of age, short, stout, and of full florid habit, who only obtained relief from violent throbbing headache by a great uterine loss, or profuse bleeding from the nose, till she was blanched and faint. On more than one occasion she was on the verge of apoplexy, when the hæmorrhage which relieved her came on.† There had been for some days previously singing in the ears, and a throbbing and

* It is important to remember that the blood in plethora is different in its composition from what it is even in active hyperæmia. With the increase in the general mass, there is also a larger number of red corpuscles and fibrin. According to Dr. Payne, however, the fibrin is somewhat diminished from deficient arterialization (Jones & Sieveking's Pathological Anatomy, page 42). The quantity of water is very considerably less, so that after venesection the coagulum is large, and the serum scanty. In the asthenic form of plethora the coagulum is softer, because the tendency to an approximation of the red particles is decreased, and they are more easily drawn asunder, by the loss of attractive force and the want of cohesion between the solid and fluid parts.

† "Plethoric persons are not more prone to inflammation than are those of weaker constitution; but they are liable to congestion, especially of the brain, and to apoplexy or other hæmorrhage."—*Carpenter's Human Physiology*, by Power, 8th edition, p. 264.

bursting sensation in the head. Purging and low diet kept the symptoms in abeyance, but never brought so much relief as this unloading of the general circulation.

A fit of passion in a sanguine person, or exposure to the heat of the sun, or overcrowded rooms and public assemblies, will excite this headache, if there be a predisposition to it.

Persons who suffer from this sort of headache look well and strong; they are usually stout and of short stature, and any exertion from which they are instinctively averse, causes a throbbing of the temples and a rush of blood to the head.

The symptoms vary in different individuals. In the more sthenic forms of plethora the pulse is full and strong, the eyes are bloated and suffused, and the countenance is flushed and hot; the veins about the temple and forehead are distended, and the patient experiences so much discomfort and confusion in his head on any attempt at movement, that he encourages his complaint from a disinclination to exert himself. In other persons, where there is less arterial excitement, and the symptoms approach an asthenic type, the pulse is small and hard; and in some it is weak and scarcely discernible or intermittent, as when the heart is flabby and weak, or there is a tendency to the deposition of fat around the heart and in the subcutaneous areolar tissue. The right ventricle is habitually too full, and the chief veins of the neck are large and prominent. Dyspnœa on exertion, and a stifling cough with pulmonary congestion, are also common in these subjects. I have met with persons of this constitution who pass urine at one time of low specific gravity, sometimes excessive, and at others contain-

ing a copious deposit of pink lithates and cayenne pepper crystals of uric acid. They eat and drink immoderately, and fall into a heavy sleep after meals. The bowels are not always costive, but sometimes loose and relaxed, and continue so without any diminution of headache. In some persons the extremities are cold, and the face has a more dusky hue, from the plethora being of a less active character. The headache is heavy and throbbing, chiefly across the forehead or the occiput, where the blood accumulates in the occipital lobes. This form of headache may precede congestion of the brain, or even effusion and apoplexy, for the whole capillary system is too full. In milder cases there is dizziness and confusion of ideas, with a mist before the eyes; and any excitement or exertion causes a rush of blood to the head, and heaviness of breathing, with oppression about the præcordia, or labored action of the heart. If a smart attack of diarrhœa supervene, the pain is partially relieved; but free hæmorrhage from the nose or bowels will cause it to depart, even after a steady continuance of some weeks.

These headaches are common in women, and are severe at the catamenial periods, when the secretion is suppressed, or during pregnancy; they are not always persistent, but occasional, and are excited by irritability of the digestive organs and deficiency in the powers of assimilation. When the latter condition exists, the fulness of habit is not so marked, and the venous system is not so loaded; the circulation is more active, and the arteries are less disposed to relaxation, while the blood accumulates in the capillary vessels.

Treatment.—Nature endeavors to promote a cure by the occurrence of hæmorrhage from the bowels, nose, or

uterus, and we must act upon this hint if we would effectually relieve the headache. I knew a young man residing in the country who was periodically bled, and in this way the strain was taken off the cerebral circulation, and his symptoms relieved. Some years ago I met with a stout plethoric female, twenty-five years of age, who was about to give up her situation from this form of headache. There was a full hard pulse, and scarcely any menstrual flow, till a free bloodletting reduced the arterial tension and restored the functions of the sluggish organs. But there are many persons (particularly women) who could not bear venesection, and who, nevertheless, are only relieved by the loss of blood from the nose or uterus. These belong to the luxurious classes, and the brain is as much in a state of passive as of active plethora; it is the accompaniment of other forms of headache, and must not be sought for alone and unmixed in all cases. Where, then, general bleeding is inadmissible, cupping at the back of the neck, or a few leeches to the anus and perinæum, may be resorted to. Saline aperients and those remedies that determine the force of the circulation to the eliminative organs, must also be employed (Form. 18–19–60–80). No relief can be obtained unless stimulating food and intoxicating drinks are given up, and the sufferers resolve to change their habits of life by early rising and regular exercise, that as much blood as possible may be diverted from the internal organs, and pulmonary and cutaneous exhalation encouraged. The sufferer, however (who is usually a bon-vivant), cannot endure much depletion, and demands vigilance and judgment in prescribing for him. Meat should be taken not oftener than once a day, and fish and vegetables are

highly to be commended. Many persons, from peculiarity of constitution and temperament, cannot maintain their health for any considerable time if they consume animal food oftener than once a day. Diet has a great influence on the composition of the blood, and we may so regulate it as to diminish the tendency to the formation of solid matter, and to increase the watery constituents. Many persons are stronger and more elastic when the consumption of azotized food is small; and in cases of this class, there is no probability of cure unless they are willing to submit to a careful regimen. Plethoric persons make blood abudantly from an innate disposition in the system to corpuscular growth, and sedentary habits and high living will encourage the predisposition.

The patient should lie on a hard bed with an elevated pillow, as the recumbent position encourages determination of blood to the head and congestion of the vessels. The meals should be light, that sleep may not afterwards ensue. Moderate and regular exercise should be taken in the open air, and the mind kept as free from disturbance as possible. "The hair should be kept short. It has been observed that monks who neglect shaving their heads after having once habituated themselves to do so suffer severely from headache."*

* Headaches: their Causes and Cure, by Henry S. Wright, M.D., London.

CHAPTER VII.

NERVOUS HEADACHE.

Common to all Classes of Society, but more particularly to persons of Nervous Temperament and Delicate Organization—Pathology of the Affection—Probably dependent on Anæmia and some peculiar Change in the Cerebral Tissue—Nerve Storms and supposed Influence of Miasmatic Poisoning—Variation in the Seat of Pain and Mode of Commencement and Termination—Want of Sleep, and Disturbance of the Mind—Disturbance of Vision—Cases of Sir C. Wheatstone and Sir J. Herschel—Distribution and Functions of the Vasomotor Nerves—Cases in Illustration of Nervous Headache—Hereditary Tendencies—Peculiar Combination of Mental and Psychological Symptoms—Origin of the Pain in Nervous Headache—Effects of Nervous Headache on the Moral Disposition—Falling off of the Hair, and Pityriasis of the Scalp—Xanthelasma Palpebrarum—Importance of Rest and Quiet—Cold to the Head and Warmth to the Feet—Effects of Quinine, and Aperient and Sedative Medicine—Bromides of Potassium and Ammonium—Guarana—Value of Hypodermic Injection, and Importance of Caution in employing it—Ferruginous Tonics, Strychnine, and Cod-liver Oil.

This variety of headache is not confined to any particular class of society, but it is of most frequent occurrence in persons of nervous temperament and delicate organization. No temperament can, however, claim exemption from it, and no habit of body is proof against it. Throughout a long life it periodically attacks those who are susceptible to it, and they surrender themselves to the irresistible evil without comment and without murmur.

They feel it approaching as a certainty from which there is no escape, and so placidly resign themselves to its torture. It is, to a certain extent, the headache of anæmia, and yet not entirely so, because many persons are affected with it whose blood is neither diminished nor impoverished, and whose muscular development and robust appearance indicate the soundest health. Amongst its victims it selects persons of high culture and vivid imagination, and if at the same time they are deprived of their full allowance of sleep, it all the more readily seizes upon them. When the brain is highly developed and the physical organization delicate, it is always likely to occur. It is in the want of balance between the mental and physical state that a nervous headache originates; for when the circulation is energetic, and the digestive organs are in sound working order, the mind may be exerted to the utmost without the risk of incurring it.

All investigation concerning this form of headache inclines towards a nervous origin—to a morbid change in the nervous centres; and this view cannot be readily dismissed until the discoveries of experimental physiology are proved to be inconclusive or erroneous. It is infinitely less probable that the cerebral blood-supply should initiate the disturbance, whatever share it may subsequently have in producing the pain. But clothe the arguments as we may to support this or that opinion, reproduce them as we will to the proof of conviction, we are still in the infancy of knowledge concerning the causes of many diseased processes, and the evidence which now appears indubitable may be far distant from ultimate truth.

Nervous headache comes on sometimes when a patient

dwells persistently on anything unpleasant, or is unable to remove his thoughts from it; when he cannot be cheerful in repose, or see the faintest sunshine in the future. This tries the brain, and disarranges the circulation within it; for "the fact is now generally admitted that thought exhausts the nervous substance, as surely as walking exhausts the muscles. Our physical framework is involved with thought no less decidedly than with feeling, and it is requisite, if possible, to define the terms of the alliance."*

Persons know when this form of headache is threatening, and by rest and extreme care they may ward it off altogether. Thus at an early stage, its full force may be averted by going to bed and falling asleep; if it threatens before the accustomed time of taking food, a moderate meal will prevent it, or a full dose of bromide of potassium. Sometimes the routine duty of the day can be got through, and the misery endured; at other times the pain reaches such a degree of severity that there is no standing up against it, and the patient is compelled to give in.

This peculiar functional disorder of the nervous centres is neither permanent nor continuous, and in the interval of the seizures the patient is as well as though it had not happened. This disease has been very appropriately, I think, classed among the paroxysmal neuroses by Dr. Hilton Fagge,† for it comes and goes suddenly, often when least expected, and without warning. But this is the character of nervous disorders generally, as facial

* Mind and Body, by Alexander Bain, LL.D., 1873, p. 80.

† Remarks on some of the Paroxysmal Neuroses, Guy's Hospital Reports, vol. xxi, 1876, p. 376.

neuralgia, epilepsy, laryngismus stridulus, gastrodynia, angina pectoris, etc. Dr. Edward Liveing* gives them the name of "nerve storms." As we shall presently see, this type of headache is among the most hereditary of diseases. From the mode and habits of life, when the nervous system has been subjected to great strain, it may break out anew in a single member of a family, when no other member of it suffers from any neurotic disorder. The occupation of each one's life exercises, either consciously or unconsciously, an important influence on the bodily and mental state, and each calling may have a large share in determining our susceptibilities. In some persons the headache, which I would designate as strictly nervous, begins with an affection of vision, the sight being clouded and dim on that side of the head where the pain commences (as in one temple), afterwards followed by the usual phenomena of sickness and confusion of ideas independent of any excess or diminution in the blood-supply. It is traceable in some cases to exhaus-

* "On this theory, then, the fundamental cause of all neuroses is to be found, not in any irritation of the visceral or cutaneous periphery, nor in any disorder or irregularity of the circulation, but in a primary and often hereditary vice or morbid disposition of the nervous system itself. This consists in a tendency on the part of the nervous centres to the irregular accumulation and discharge of nerve-force—to disruptive and uncoordinated action, in fact; and the concentration of this tendency in particular localities, or about particular foci, will mainly determine the neurosis in question. The immediate antecedent of an attack is a condition of unstable equilibrium and gradually accumulating tension in the parts of the nervous system more immediately concerned, while the paroxysm itself may be likened to a *storm*, by which this condition is dispersed, and equilibrium for the time restored."—*On Megrim and Sick Headache*, 1873, p. 336.

tion, fatigue, and losses of blood; but more commonly to worry and anxiety; in others, no cause can be assigned—it comes and goes without any satisfactory reason, and lays the robust and square-shouldered man as prostrate as the overdrained sickly woman. In employing the term "nerve storms," Dr. Liveing implies that there is an accumulation of nervous force which explodes in the shape of headache; and it is certain that all who have carefully observed the phenomena leading up to an attack must have been struck with the excitement of manner and irritability which precede the outbreak. The period may vary from a few hours to many days. In some confirmed sufferers I have repeatedly witnessed a series of symptoms which have culminated in an attack, and no ease has been obtained till the affection has worked up to its height. There is a period during which disease obtains the mastery, and all remedies are unavailing to keep it in check. If the general health is reduced, the attacks are more frequent, and recur with no precise regularity; but when the health is stronger, the intervals are also greater. Worry is a common exciting cause in both men and women, especially if they are sensitive and given up to society and excitement. A mind ill at ease becomes exalted or depressed, and the cerebral circulation being unsteady deranges the nervous structure. Overwork of the brain is another cause in those persons who live in towns and large cities, and pursue sedentary occupations.

When the paroxysms recur with regularity, miasmatic poisoning requires to be taken into consideration; but I must say that this cause has rarely suggested itself to my belief, for nervous headache is more common to residents

in large and populous towns, where marsh poison does not prevail, whilst it is questionable whether the disease is especially frequent in aguish districts. When a nervous headache, having all the characters of true migraine, follows certain articles of diet, as pork, butter, fatty articles of food, and alcohol, it is beyond doubt that these have had a large share in provoking the mischief. We are repeatedly told by patients that, unless they observe the greatest care, they will suffer the penalty of a headache for indiscretion.

The pain most usually attacks the forehead and vertex, but sometimes the occiput and back of the neck. After it has lasted some time, it not unfrequently seizes upon one temple, or one eye, or one half of the head, and thus resembles the headache of neuralgia. A married lady, æt. 30, consulted me in May, 1876, for a nervous headache, to which she had long been subject. It began over the forehead, and in the course of an hour or two would seize on the left eye, where it would continue for a whole day, and then leave her after a night's rest. The feeling she described to be as though something was forcing out the left eye, the tears running over the cheek so plentifully that it became inflamed and sore, while the pain extended down the left side of the nose; also light and sound became intolerable to her. The patient stated that through life she had been subject at times to "*bilious attacks*," and, though still she often would feel nausea, she never actually vomited. With this condition of the brain the hands and feet were always cold, and, if the pain had continued long, the head grew hot, as if full of blood, and the face became flushed. However severe the suffering, she could always eat her dinner, which some-

times relieved the pain, and at other times increased it. When the pain was coming on, she told me that she was always inclined to cry at the slightest thing.

The approach of headache in some persons may be foretold by the sluggish action of the bowels, a loathing of food, together with flatulency and eructation. In the same class of persons, at other times, I have known a state of chilliness and a very scanty and turbid secretion of urine to precede the headache; while with other persons, the passing of a large quantity of limpid urine may be the forerunner of an attack. In others, again, there is extreme irritability and disquietude; the patient cannot keep quiet for an instant, and no efforts avail to calm or appease her; all things are wrong—nothing goes right. The pupils are contracted, the eyes sunken, the pulse feeble, and the extremities cold. Then succeeds a period of calm and surrender, and the patient is completely exhausted and overcome. This headache is most frequent among women who are approaching the middle period of life, and who are exhausted by the strain of maternal duties. If they have borne children rapidly, and the uterine functions are active, then it is of common occurrence. Oversuckling, menorrhagia, and profuse leucorrhœa are also causes; dysmenorrhœa, and even ordinary menstruation, will bring it on in some persons. As regards menstruation as an exciting cause, the quantity of loss affords no explanation, for nervous headache is as common where the catamenia are deficient, as where they are in excess. The ovarian irritation which prevails at these periods, induces a painful condition of the cerebral nerves through sympathetic action; and there are women who invariably suffer in this way at every menstrual

period, when the quantity of loss cannot explain the occurrence of the pain. The real disorder is in the nerve-fibres of the brain, which become deranged from distant sources of irritation acting through the sympathetic system.*

Constipation is sometimes held to be a cause of nervous headache, when, in reality, it is an effect. If, when the attack comes on, the bowels happen to be costive, the pain in the head is increased from the greater sympathetic action; but if they happen to be relaxed, the pain is the same, and mere looseness of the bowels does not relieve it. Those who are subject to this form of headache, although they may have escaped it for many years of their life, are persons whose constitution is originally weak. I have known persons to reach the age of thirty-five before getting an attack, and then, circumstances having arisen to lower the standard of health, the consequent excessive waste of nervous matter has rendered them liable to the complaint. The hard-worked physician, the laborious scholar, the anxious merchant, who toil hard and late, and neglect the ordinary precautions of health; the corrupted youth, who has sacrificed himself to vicious habits; the anæmie girl, and the half-starved seamstress—all are victims to this terrible form of headache. Those who dwell in the fashionable world, and keep late hours, are particularly subject to it; for hot rooms, evening parties, and imperfect ventilation are always likely to produce it.

But, in addition to the activity of mind and the emotional sensibility which are common to the sufferers of nervous headache, there is a state of the bodily constitu-

* See Chapter III, on Sympathetic Headache.

tion which renders people liable to it. In a lowered condition of the general health almost any cause will induce an attack. Prolonged study, the mind being kept bent on the accomplishment of a task in a given time, pondering over figures that require much mathematical calculation, the jarring of vehicles over bad roads, the alarm and timidity at driving along crowded thoroughfares, and disagreeable odors of all kinds, will be sufficient to invite it in some cases. All forms of peripheral irritation of the senses of sight and hearing excite increased central irritation, especially in cases of meningeal mischief; consequently we find that darkened rooms and absolute silence are excellent palliative measures. Moreover, depraved secretions in the alimentary canal, or any morbid impression on the gastric nerves, will bring it on.

Difficult as it is to fix upon exciting causes, we can hardly escape the conviction that derangement in the chylopoietic viscera has an important bearing in the causation of the malady. The interruption to the process of digestion caused by travelling on a full stomach invariably brings on a headache with some persons. I have met with several cases, and one in particular, where a gentleman always suffers from headache if he goes a journey shortly after taking food. There are persons of similar nervous organization, who experience a sharp attack of diarrhœa at the prospect of travelling by rail, or going a sea voyage.

Disturbance in the electrical states of the atmosphere will excite an attack of nervous headache in some persons. By these persons the approach of a thunderstorm can be calculated with an absolute certainty from the feeling of weight over the forehead and a severe headache.

Long before thunder is heard, or the patient has any conception that a storm is coming on, he is heavy and oppressed, or restless and timid; there is a weight across the forehead, and he is unable to exert himself in mind or body. If he attempts to read, his temples beat and his forehead aches, his face flushes, and his last meal has probably caused flatulence, and a sense of heat and dryness in the mouth. Abstinence from food and continuous effort may keep the pain in abeyance, but still it clings to him more or less, and he gets through the day's work miserably enough.

As regards disturbances of vision, all the patients who have complained to me of this symptom have described a painful sensation on attempting to read or look at objects, and a misty or clouded appearance before the eyes, of flashes of light and dazzling sparks in the field of vision. One female patient assured me that a dim and clouded appearance before the left eye announced the commencement of the attack for some hours before the head began to ache. Sir C. Wheatstone, Sir John Herschel, and other eminent men describe their own experience of it, and for another interesting account, I would refer to the *Philosophical Transactions* for 1870, "On a Distinct Form of Transient Hemiopsia," by Dr. Airy. Sir J. Herschel describes a singular shadowy appearance at the outside corner of the field of vision in the left eye, coming on when he was doing nothing and thinking of nothing. It gradually assumed the drawing of a fortification, with angles, bastions, and ravelins, and faint lines of color between the dark lines, and the impression was the same whether the eyes were closed or open. It lasted a minute or two, and spread over the whole visual

area, and was not followed by headache as it was in another case. The account given by Dr. Airy of the phenomena is very interesting, and will repay careful consideration. "Another very important point about these attacks is, that in perhaps from one-fourth to one-third of cases, during this glimmering stage, there is tingling some portion of the body—the part is *asleep*. In a young female that I saw, the tingling affected one arm and the side of the tongue, and, curiously enough, both her sister and her father were affected in precisely the same way. The tingling was on the *same side* as that on which the glimmering in the eye began. In another case, the patient complained of a feeling of pricking and scratching on that side of the face corresponding with the glimmering. In others, speech or hearing may be affected."* The persons who suffer from ocular disturbance are, in my experience, most frequently women of nervous temperament, who have active brains, and are energetic and restless. They are often anæmic and subject to chronic debility. Fatigue of all kinds and over-excitement will lead to it, and all drains, leucorrhœa or menorrhagia, which exhaust the system and lower the bodily tone, are common causes. Under "Sympathetic Headache" I have described how this state is brought about, and I may here mention that the vasomotor branches of the sympathetic nerve regulate the contraction and dilatation of the bloodvessels of the brain; and we have seen that when the cervical sympathetic was divided, there was an afflux of blood and a dilatation of the vessels. When the vessels of the brain are contracted,

* Dr. Latham, on Nervous or Sick Headache, p. 10.

the supply of blood is diminished; when they are dilated the quantity is increased, and this is an explanation of the headache that results after the stage of excitement has passed, when the systemic circulation is heightened and increased.*

The following case is one carefully studied, and may be regarded as a type of nervous headache. Each attack seemed to divide itself into two distinct periods,—*first*, the stage of irritation, where the brain is first at fault, and the stomach secondarily affected; *secondly*, the neuralgic stage. This will be best explained by the sufferer's own account, as communicated to me from time to time:

A. B., æt. 49, began to suffer from severe headache twelve years ago, being then the mother of four children which she had had in rapid succession, besides two prema-

* "That there is a vasomotor centre, and that it is intraeranial, we learn by observing, first, that if the medulla is divided immediately below the cerebellum, all the arteries are relaxed, and that a similar effect is produced if certain afferent nerve-fibres which lead to the intraeranial part of the cord are excited. Its position has been lately determined with great precision in the rabbit by Ludwig and Owsjannikow, who have found by experiments that it is limited towards the spinal cord by a line four or five millimeters above the *calamus scriptorius*, and extends towards the brain to within a millimeter of the *corpora quadrigemina*.

"That the vasomotor centre is in constant automatic action is shown by the paralyzing effect of section, whether of the spinal cord, or of any nerve known to contain vascular fibres. If the action of the centre were not constant, division could not produce arterial relaxation. In relation to this constancy of action, the word *tonus* is used. Arterial tonus means that degree of contraction of an artery which is constant and normal. It is maintained only so long as the artery is in communication with the vasomotor centre."—*Handbook for the Physiological Laboratory*, "Functions of Vasomotor Nerves," by Dr. Burdon-Sanderson (Text 1873), p. 235.

ture births, all in the course of seven years. After this she had great and frequent catamenial losses, which compelled her to keep her bed or to remain in a recumbent posture for days together. The headaches generally came on the third day of the loss, though occasionally at other times, and then they were always traceable to fatigue or worry. At the onset of each attack she complained of violent pain on the top of her head (which was always very hot), extending over the occiput to the neck. The eyes were sunken in the orbits, and the pupils were small and contracted, and there was a feeling as though they were being pulled back into the head; light and sound were intolerable; the feet and hands cold; the pulse slow and feeble, sometimes not exceeding fifty beats in a minute. The bowels refused to respond to medicine. Sometimes she obtained partial relief from ice on her head, while at other times she could not lie still, but kept pacing up and down the room, with her mind much disquieted, and a wish to die. When the suffering was acute, the patient could not rest her head on the pillow, nor could she open her eyes or engage in conversation. She was continually tossing and turning from one position to another, while her mind indulged in the most melancholy forebodings, and renewed the fancied grievances of a lifetime. She could not escape from the toils of calculation; her mind kept running in a narrow groove, and all things appeared distorted. This stage would last as long as thirty-six hours, being sometimes accompanied by sickness, and sometimes not, but no food could be borne, and her sleep, which was broken, seldom brought any relief, for she continually awoke groaning with pain. Very gradually, however, a change in the character of the headache in-

variably ensued ; acute neuralgic pain, coming and going over one or both brows, would set in, and occupy the place of the other, which now slowly decreased. From this moment she was able to take plenty of soup, champagne, and quinine.

This case baffled all attempts at relief till the hypodermic injection of morphia was tried ; and then, after days of maddening pain, the patient would turn round at once and sleep tranquilly for twenty-four hours. She awoke with the neuralgic period to ensue, but fortified to bear it, and after a few days' weakness and exhaustion, during which the eye retained the drawn-back feeling, she regained her usual health.

NOTE.—*February*, 1877. During the last six months the patient has suffered less from the variety of headache she formerly complained of, but her general health has sensibly declined, and she is fatigued after the slightest mental or physical exertion ; the noise of the street, the sound of music, or the excitement of ordinary conversation are all too much for her, and she has the manner and appearance of a confirmed invalid. Her blood shows indications of great impoverishment and anæmia, as evidenced by an irritable and red eruption on the nose and face, troublesome pityriasis of the scalp, and purple patches of ecchymosis at the inner angles of the upper eyelids, which are always increased during and just after a seizure of headache. When the eruption began to subside she complained of pain in and about her eyes, of a very distressing character ; she could not bear the light, and to move the eyes (especially the left), either outwards or inwards, caused acute suffering. There was also frequent neuralgia of the right and left brow, and

she had great difficulty in reading, her sight seeming to go for a time when she made the effort, the letters appearing clouded and misshapen. The light was so trying to the eyes that she always preferred a darkened room, and when able to venture out of doors she wore blue spectacles with advantage. There was no optic neuritis. Six months' absence from home life and staying at different quiet places where the air was pure, and getting plenty of rest, restored her general health in a remarkable manner, and enabled her digestive powers to assimilate iron and arsenic (Form. 24 *b*) and a glass of port wine at her midday meal. She was also able to take brandy and egg mixture, and a full dose of quinine when an attack of hemicrania was threatening. Bromide of potassium at night, and aconitina ointment (Form. 112–113), applied over the brow, often cut short the paroxysm, and procured sleep. Moderate exercise, short of fatigue, was of advantage, but the least worry or anxiety invariably threw her back for several days. All chance of success depended upon the power to improve the quality of the blood, and to remove the anæmia of the tissues.

NOTE.—*October*, 1877. On returning to home duties a severe paroxysm came on, and after three days of increasing agony and confinement to bed without a moment's respite from pain, she suddenly became collapsed and pulseless, with cold extremities, and her condition for a few minutes was very alarming. She was unable to swallow for some time, till external warmth and friction had restored her faltering circulation, and then the effort was accomplished with the greatest difficulty, owing to a sense of suffocation which the attempt excited. From

this time "the nerve storm" abated in severity, leaving the patient very prostrate, but free from pain.

NOTE.—*April*, 1879. Since the above report the general state of health has improved, but the headaches have assumed a more neuralgic type, the pain seizing the right or left temple, or both temples, and finally settling into what she describes as "the back of the eyeballs." It is of so severe a character that she cannot bear the light, or even lie still for many minutes together. There is generally coldness of the extremities, shivering, pallor, small contracted pulse, and a sense of indescribable misery and exhaustion. A full dose of quinine (five grains, with a few drops of spirit of chloroform and water), followed soon afterwards by a glass of champagne, or brandy in soda-water, has sometimes been found to shorten the attack, if given early enough; but more often the suffering has been prolonged over two days, notwithstanding that the quinine has been repeated every two or three hours, with various kinds of nourishment given in the intervals. The pain is traceable to indigestion, worry of mind, fatigue, excitement, and cold winds.

C. D., æt. 40, m.; three children, one miscarriage, active and energetic temperament. When she first consulted me in November, 1874, she had been complaining of headaches for five months previously. Any exertion would bring these headaches on, and they generally came either after or during the flow of the catamenia; especially if she took extra exertion, or was in any way excited. The patient had suffered from neuralgia of the face for many years, but these attacks seldom recurred now. When these headaches were coming on, small

things would worry and annoy her; she could not sleep, but would light a candle and read. They did not come on suddenly, but the patient was aware of their approach, and could ward them off altogether by rest and quiet. The bowels were always inclined to act too freely, and before marriage there had been great dysmenorrhœa. First, a general sense of discomfort and confusion in the head was felt, trifles assuming undue importance, one idea running persistently in her head, while the patient lost all sense of proportion.* If the pain increased, it became localized in the temples and the top of the head, and there was a feeling as if something were being driven into them. "It seems, however," said the patient, "as if my spine must be in some degree affected, for I am obliged to lie with my chin raised, so as to rest the back of my neck." The intense pain varied considerably in duration —from about six hours to twenty-four. When the head-

* All states of nervous exhaustion, whether brought on by inordinate indulgence in drink, or by the ordinary avocations of life, are capable of giving rise to subjective sensations of the strangest character. They may be described as hallucinations—phantoms of the unreal and imaginary. I have met with some sufferers from headache who, in their suspended moments of agony, have told me that they had no power to give the aching brain rest. As the pain lulled, the functions of the brain became unduly active, and the mind busy with the miraculous; tortured with the fear of death, or the dread of committing suicide. Emotional excitement, and real or imaginary wrongs, will take possession of the sufferer, and he can no more command himself and shake off the supernatural belief, than he can bid the throbbing brain be still. This is the outcome partly of a disturbed circulation, causing, it may be, some arrest or interference with the passage of the blood through the vessels which supply the brain and nourish its delicate tissue, and still more of an irritable and exhausted state of the cerebral cells. Irritability is the forerunner of exhaustion in nerve-matter.

aches abated, sleep generally ensued for a considerable number of hours; and, on waking, the pain was gone, though the head was sore and weak. If the attack was very acute, five or six days would elapse before she recovered her usual strength. Formerly, when the headaches were very severe, she had slept badly for six months; now she had quite recovered her sleep, except just before an attack of headache. The patient writes (April, 1876) that she followed medical advice for six months. In addition to the headache, when she first consulted me, there was great uterine loss and relaxation of the bowels. Both these functions are right now, but if she happens to get a return of the one, she also has a return of the other. The headaches are far less frequent than they were eighteen months ago, and as a rule much less severe. At the time of consultation (November, 1874), the pulse was weak, and only sixty beats per minute; the tongue was clean, the eyes were energetic, but her looks showed exhaustion. The treatment consisted in all possible rest, mental and physical, particularly at the menstrual periods. A preparation of iron (Form. 39) was to be taken twice a day after food, and bromide of potassium at night (Form. 40). A month later all the sumptoms of relaxation had improved, and bromide of ammonium was substituted for the previous medicines (Form. 25). At the close of December, 1874, the bowels were more regular, and there was less headache and irritability; the pulse was firmer, and the beats were seventy-two per minute.

It may be interesting to note that the mother of these two patients, who were sisters, suffered in the same way, and that she was for years under the late Dr. Todd. She suffered from extreme meningeal irritation, and re-

mained in bed for days together in a darkened room, unable to eat a morsel of food or to retain a drop of anything on her stomach. During a period of twenty years, whilst these headaches lasted, fears were entertained that she would lose her intellect. After the age of sixty she ceased to suffer from them, and is now not only entirely free, but her activity and powers of endurance may well be envied by persons who are half her age.

The following is another example of nervous headache; and it presents an assemblage of symptoms, which prove unsteadiness in the brain-centre, and a hyperæmic state of the cerebral vessels from partial paralysis and dilatation. It is a matter of no great importance whether the cause is attributable to overindulgence in spirituous liquors, or to excessive mental activity. The consequences and the train of symptoms are much the same in both instances. And I must here insist on the fact that the true congestive headache has features in common with the nervous form in some stage or degree of the attack. F. H. B., æt. 31, married, first consulted me on December 5th, 1873, for headache, to which he had been subject since 1860. He is tall, slender, pale, and dark, and leads a life full of intellectual activity, exerting his physical and mental strength to the utmost, and seldom taking that allowance of rest which is essential to the enjoyment of moderate health. Eighteen years ago he had scarlet fever, succeeded by congestion of the kidneys and dropsy. At this time he had agonizing headache, leading to effusion of the brain and insensibility. There is little doubt that these symptoms were due to the retention of urea in the blood. When he recovered from this illness he suffered from irritative dys-

pepsia, which lasted for a year or two. The attack of headache in question came on from dining in the middle of the day, and walking afterwards. The pain grew worse and worse, and at length he became sleepy and retired to bed, when he seemed a little better. He awoke at 10 P.M. with a kind of muddling pain, and a dreadful feeling as though his head was filled with lead, and then followed a sensation of stuffiness and throbbing. Sometimes there was a pain as if the head was opening and shutting. The headache began in one or the other temple (formerly in the left temple); it passed through to the occiput, and extended down the cervical vertebræ, rendering the muscles of the neck stiff and painful to move from a fixed position. The headaches were sometimes attended with nausea, and sometimes preceded by dizziness. They usually came on in the morning, with a dull oppressive weight and pain; but this time he was attacked later in the day, and, as the pain grew bad, he became cold and shivering. The urine was clear and free from albumen, the bowels regular, the tongue slightly coated; the pulse 72, small, weak, and regular. The heart was healthy, and free from any organic or functional bruit. The psychological symptoms were peculiar. He would feel he ought to do a particular thing, but could not bring his mind to do it; he was playing at cross purposes, and contending between reason and obstinacy. He would not allow his wife, whom he loved, to come near him; but he would allow the nurse, whom he hated. He was irritable, and knew intuitively the remedy of three which would abate the headache; but unless his attendants could find out which it was, he was so perverse that he would not tell them; and if they brought the wrong one,

he was frantic and uncontrollable. In this respect he resembled his child, who also suffered from a similar form of headache. When he was overtaken with these headaches he could not keep still or lie down, but was perpetually walking about. As to remedies, an emetic was one of the most speedy and effectual; but the quickest remedy of all was a mustard poultice applied to the back of the neck, the feet being immersed in warm water This sent him soundly to sleep in half an hour. The day after the headache was simply one of dulness and inactivity, and if he exerted himself it would return.

I ascertained in May, 1876, that this patient's headaches were less acute, less frequent, and less inevitable than formerly, and that there was less perversity and violence of manner. A dull heavy feeling frequently threatens, but gives way to rest or treatment. Hot water to the feet, and rest, are still the two chief remedies he relies upon. He still uses a mustard poultice to the neck when the pain is very bad, but this now very rarely happens. Brandy never gives the slightest relief; and music, which at one time seemed to arrest the headaches magically, has no effect at all now.

The following is an example of nervous headache of the severe type, not promising great benefit from treatment unless the occupation and habits of life can be entirely changed.

S. B. T., æt, 43, m., consulted me May 31st, 1877. Has served twenty-seven years as an officer in the Indian army, and during this time experienced good health except on two occasions. The patient was thin and spare, of energetic habits, and nervous temperament.

In 1857 he had severe malarious fever, which compelled him to return to England for eighteen months.

In 1867–8 he held a responsible and anxious post during the Abyssinian war; the strain of mind and body was so great, that at the end of the expedition he was compelled to return to England, when he suffered chiefly from sleeplessness and disinclination for mental work. Two years' residence in this country completely set him up, and he returned to India in July, 1870, quite recovered.

In 1872 he was subjected to severe mental distress, and about this time *continuous* (as distinct from *occasional*) headaches commenced, and from these he is still suffering.

He thus writes: "I appear to suffer from two distinct headaches; the one occurs only at distant intervals, varying from one to three months; the other is *continuous*. The *occasional* headache gives some notice of its approach, feeling out of sorts for a day or two previously. It commences soon after awaking in the morning, and increases in intensity during the day; the pain is distracting, head hot, with sense of fulness, extremities cold, and nervous twitching. Cannot bear a reclining position for a moment, but compelled to keep constantly walking up and down, till sometimes ready to drop from fatigue; when pain moderates sufficiently to make sleep possible, still obliged to avoid a recumbent posture, and get my first sleep either in a chair, or propped up with pillows in bed. These attacks leave no trace behind, except a little shakiness next day. A strong saline draught sometimes shortens their duration, and in unusually severe attacks, an ice-bag to the head, and occasionally (though

seldom) I inhale a little chloroform to deaden pain, but not sufficient to cause insensibility.

"The *continuous* headache first commenced about five years ago, shortly after the mental strain in 1872. At first symptoms slight; would wake in the morning feeling unrefreshed, and with a most uncomfortable sense of giddiness and weight in the head; this would generally go off at ten or eleven o'clock.

"But by degrees the periods of freedom from discomfort became shorter; there was difficulty in getting sleep; would constantly go to rest and sleep well for an hour or so, and then awake and be unable to sleep for several hours, generally getting up and reading in the intervals. There was great disinclination for mental work, and a putting off from day to day of business or duties, which, when circumstances compelled to be taken in hand, were transacted on the spur of the moment with satisfaction."

As he continued in this state for four years, not growing better, but on the whole worse, he was obliged to return to England—in May, 1876.

He has derived no benefit at present from being in England, as he suffers continually from this headache.

The symptoms are so variable that it is difficult to describe them with precision. As a rule, there is a dull heavy pain in the head, accompanied with giddiness and with *throbbing*, which is sometimes so intense that the beats are distinctly felt in both ears, whilst at other times the pain is slight, and less of a throb than a sort of undulating pulsation.

There is often pain immediately over the eyebrows, great soreness of the eyes, and unwillingness to face the

light. The headache is sometimes in the brow, when it is generally accompanied with heat of surface; at other times it is confined to one spot (about the size of the palm of the hand) in the centre of the top of the head, and at others it is over the occiput and nape of the neck.

Again he writes: "When very bad, every noise seems to go through the brain; the sound of talking in the room is so unbearable that I am compelled to go away and remain in a room by myself. Occasionally there is very great irritability, and a sort of weary restlessness, inducing a constant desire to travel about from place to place. There is unwillingness to exert the mind in any way; reading is taken up as a distraction, and as the memory is affected the subject is speedily forgotten. Notwithstanding disinclination for exertion, the want of regular occupation (to which I have been long accustomed) is severely felt, and has, I think, done more to prevent improvement than anything else.

"For the first eight months after returning from India, sleep was most irregular; night after night lying awake till two or three in the morning; but during the past few months there has been an improvement in this respect, and a broken night's rest is the exception, and any feeling of wakefulness yields to tincture of cannabis indica in twenty-minim doses, leaving no unpleasant effects next day.

"My appetite is better than on my first return from India; digestion good. I am temperate, but smoke freely, and the inclination is greatest when irritable. For the last four months the headaches seem to increase in intensity at regular intervals of from fourteen to sixteen days, and sometimes there is a feeling of weakness

and pain in the limbs. On returning from India I was examined, and the *spleen* was found to be tender on pressure, but the *liver* was free from disease. Took podophyllin, hydrochloric acid, and taraxacum; later on, took bromide of potassium three times a day for a month without benefit; neither the sleeplessness nor headache had diminished. Then a blister was applied to the neck, and arsenic taken, without benefit; after this, strychnine failed. Recently quinine in gr. v doses was prescribed, and failed, and gr. x doses gave no relief.

"The *headaches* are not hereditary in our family, and my brother is singularly free from them, being able to say that he has never had a headache in his life."

He has been constantly moving about to Scotland, to Wales, Folkestone, and Cornwall, without deriving benefit. Cannot ascertain what causes the headaches; they appear to become more intense, and to moderate without special cause; no medicine has any effect.

May 31st. (His first visit.) Had intense weight this morning over head; giddiness up to 10 A.M., which has left only the feeling of weight: the pain moves about from one part of the head to another. Tongue bluish and furred; pulse 64; pretty good; very regular; urine pale-straw color, sp. gr. 1020, and non-albuminous; liver healthy; heart weak.

N.B. The great feature of this case is nervous exhaustion, and a most languid circulation. Arsenic, iron, and calumba were prescribed twice a day (Form. 24 *b*), and bromide of ammonium on rising in the morning (Form. 25). The diet was ordered to be plain and simple, stimulants to be avoided, and no tea.

June 19th. He writes: "I think that, on the whole,

I can fairly say that I am better; the periodical attack is somewhat less severe, and I have not suffered quite so much either from giddiness or headaches; but the sense of heaviness and dulness still remain constant."

To continue cod-liver oil, or malt extract, and Carlowitz or claret.

From his account he had evidently taken too much exertion, and fatigued himself.

September 30th. Benefited and improved for two months in Wales, but when out in the garden one day picking strawberries, the sun was powerful, and beating fiercely down his back whilst stooping. In the afternoon one of his severe headaches came on, and he has never been well since. The weather after this was damp and depressing for six weeks; he felt weak and depressed; the chief new symptom was aching pain in the small of the back, which he has never lost. Frequently he felt feverish, and on one occasion, soon after the "sunning," had a distinct but mild attack of ague. Giving up smoking did no good; the pain in the back gives more uneasiness than the headache itself. As he was obliged to return to India, he was advised to avoid the heat of the sun, and as much as possible to live quietly. A simple plaster was ordered to the back, and hydrobromic acid and quinine twice a day (Form. 14).

The origin of the pain in migraine is supposed by some authorities to reside in the optic thalami, and the visual defects to originate in the organ of the affected side, and then to extend downwards in the course of the sensory tract. I must refer the reader to the different opinions held by Dr. Broadbent, Dr. Ferrier, Dr. Bastian, and

Dr. Crichton Browne.* The latter writer, in speaking of the blood-supply to the great ganglia of the corpus striatum and thalamus opticus, thus writes: "But the middle cerebral, the chief artery of the corpus striatum, is distributed to the motor regions of the cerebrum, while the posterior cerebral, the chief artery of the optic thalamus, is distributed mostly to the sensory regions of the cerebrum. These facts surely suggest the intimate association of the corpus striatum with motor, and of the optic thalamus with sensory functions."

In some few instances I have known the hair to fall off from continued nervous headache, and when this happens the scalp becomes the seat of great irritation, with troublesome pityriasis. Both Cazenave and Neligan have observed the same.† Two cases are in my recollection where the scalp became the seat of so much irritation that

* Dr. Crichton Browne's paper on The Functions of the Thalami Optici, in the West Riding Lunatic Asylum Medical Reports, vol. v, 1875, p. 129.

"According to M. Hervez, of Chégoin, migraine is an arterial neurosis which takes its origin in the great sympathetic nerve, and its seat is in the nervous filaments which accompany the arteries, whilst it manifests itself in the dilatation of these vessels, and in the compression of the brain and other organs it produces. The treatment of migraine consists in combating the tendency to periodicity, the pain and the arterial dilatation. M. Hervez finds the following prescription of essential value in fulfilling those indications. He gives every day one pill containing about one grain of sulphate of quinine, one grain of tannic acid, and a seventy-fifth of a grain of aconitina. The dose may easily be increased to three or four such pills daily." (*Journal de Médecine*, December, 1876.)—Quoted from the *Practitioner*, March, 1877, p. 197.

† Neligan, On Diseases of the Skin, 1852, p. 250. The late Dr. Anstie after each attack went gray over the temple which was subject to neuralgia.

the patient could not summon up sufficient fortitude to resist scratching her head incessantly. The itching, tingling, and the abundant desquamation of white-brownish scales, are invariably increased after each paroxysm of headache. I have so often noticed the coexistence of dandriff with imbricated scales in those who have suffered from confirmed nervous headache, that it must be more than accidental. It is a constitutional affection, in which the nervous system is largely concerned, and the most frequent cases in my experience have been in women about the middle period of life, who have suffered from catamenial disturbance. It is not improbable that a local irritation may be induced through the branches of the fifth nerve, as they ramify over the scalp, and so lead to an excessive secretion from the sebaceous glands. When the greasy scales so formed are allowed to remain, they become dry and brown, and in some few cases the scalp underneath is tender and reddened. But it is important to distinguish the disease from eczema, which may generally be done without difficulty; true pityriasis being characterized by an absence of exudation and albuminous secretion. A weak ointment of nitric oxide of mercury is an excellent application (Form. 114 *a*).

Another curious affection of the skin is sometimes observable in women about the middle period of life, who are great sufferers from nervous and neuralgic headache, patients who have endured severe pain for years, and who are much exhausted in consequence. Their dark shrivelled eyelids and blank expression of the face attest the fact beyond doubt. The complaint to which I allude is known as *Xanthelasma Palpebrarum*. "The pathological nature of this affection is an hypertrophy and altered

color of the epithelium of the sebiparous gland and of its excecretory tubuli."* It is a new growth of connective tissue infiltrated with an oily material which imparts to the discolored integument the buff or yellow color. The disease consists in defined patches of discolored skin, of irregular outline, occupying the upper and lower eyelids at the inner canthus. They are variable in color, sometimes being of an orange or lemon tint, but that of chamois leather, or nankeen, is a good resemblance. They are smooth and soft, and look like caseous matter immediately beneath the skin. The patches are not attended with pain or irritation, and they never ulcerate nor suppurate. They are generally looked upon as permanent and incurable, but Professor Erasmus Wilson says he succeeded in removing the disorder in one patient by the application of compound tincture of iodine, and by the internal exhibition of arsenic.†

Treatment.—Here a task of exceeding difficulty lies before any writer, and no amount of experience enables him to lay down any uniform plan for adoption and guidance. Every case must be treated on its own merits; absolute and binding rules are useless. A method of treatment which has answered our expectations in one case is futile and barren of results in the next; the misery pursues a determined progress till the attack is over. Practically, then, the patient resigns himself to his fate, till the nerve-storm has worn itself out by excessive expenditure, and sleep has readjusted the tremulous circulation within the head. If we can induce the patient to

* Diseases of the Skin, by Erasmus Wilson, F.R.S., 1863, p. 619.

† Op. cit., 1863, p. 620.

alter the habits of his life, we may hold out the prospect of arresting the frequency of these headaches; and, moreover, we shall bestow some ease and comfort, if we can fortify the general health to resist them, till increasing years and physiological changes in the different organs of the body, render the patient no longer susceptible to them. In one instance constant change of scene and place, by occupying the patient's mind with new ideas and pleasant thoughts, kept the disease at bay. We may lay down golden rules, but the circumstances of life seldom admit of their being observed faithfully or consistently. A man is obliged to live in a large town, and from bad air and want of exercise he gets severe headaches; if he resides in the country he loses them. But he has no choice of residence; his lot has fallen among the noise and crowd, where all is hurry and excitement, and he is driven forward with the throng, as feeble to oppose it as the stream of a gentle rivulet is to reverse the course of the mountain torrent into which it falls.

When a nervous headache is threatening, the patient should lie down and observe the strictest seclusion and rest; and if this be done at an early stage, a severe attack may sometimes be averted altogether. The sudden influx of light when the curtains are drawn up of a morning in a dark bedroom, may instantaneously cause the return of a bad attack, previously stopped by a good night's rest. Mr. May, of Reading, once had under his care a most remarkable case of a lady subject for years to "intense headache and intolerance of light, commencing on first awaking in the morning, and persisting more or less all day." The immediate effect of the first influx of light was to cause a severe frown, followed by headache.

Mr. May cured the patient by covering one eye with a card to which was attached an elastic tape, and this was passed around the head, so as to slightly compress the occipito-frontalis and corrugators. "This simple device effectually prevented the frown, and there was at once an end to the mischief." The eyes were afterwards gradually accustomed to light by being alternately covered and uncovered by the card for two hours at a time, so as to regulate the admission of light. The patient completely recovered, and remained free from headache till her death about eighteen years later.*

When persons derive benefit from lying in a recumbent posture, and taking a glass of wine or some other diffusible stimulant, at the beginning of the attack, the cerebral vessels are insufficiently supplied with blood; and hence, by stimulating the heart's action, the blood is propelled to the cranium with increased force, and relief is obtained. This is the stage and form of headache where people (especially fashionable ladies) overfatigued from driving and excitement in the London season lose their headaches as the dinner advances, and they consume more wine than is advisable. The feet and hands are often cold at this stage, the skin is shrivelled and dry, and the pulse is slow and weak; there are in some cases glimmering flashes of light before one or both eyes, and the patient is depressed, prostrate and helpless. She both feels and looks wretchedly miserable. When altered sensation has not entirely merged into pain irritability, agitation, and disquietude are the prevailing features of the affection. Now, I believe that if a stimulant is to

* The case is reported by Mr. Hilton in his lectures On Rest and Pain, 2d edition, 1877, p. 147.

be of any service, it should be given at the onset of the symptoms; and if there exist nausea, or more certain derangement of the digestive organs, we shall certainly increase the evil by the exhibition of a stimulant. And why? Because the ganglia of the sympathetic nervous system, being exceedingly impressible, transfer the irritation from the splanchnic and gastric nerves to the nervous centres in the brain, causing the vessels to become unduly dilated through the action of the vasomotor nerves, and so the headache becomes more violent and throbbing than when the encephalic supply of blood is diminished.

During the acute stage of a severe nervous headache there is so little to be done that it is the best plan to leave the patient, alone and quiet, in a darkened room. Beyond applying cold to the head by means of a sponge wrung out of cold water, or the ice-cap previously spoken of, there is nothing to be done. Interference is cruelty. If we put anything into the stomach, we shall increase the nausea and aggravate the pain. I have sometimes known a warm bath, and afterwards a bottle of hot water to the extremities afford relief, by dilating the systemic vessels, and in some way altering the circulation within the head. If the pulse is good, and the face is at all flushed, an emetic of mustard, or a scruple of sulphate of zinc (Form. 108), will rid the stomach of any offensive matters, and give immediate ease. But it often happens that the nausea is extreme when the stomach is empty, or after vomiting has continued some time.

In these cases it is best to try and relieve the sickness, and for this purpose hydrocyanic acid may be given

alone (Form. 41), or with citrate of potash in effervescence (Form. 42). A mustard poultice, or a small mustard leaf to the epigastrium, or at the back of the neck, and a piece of ice to suck, are also worth trying. Soda-water and a little dry champagne or brandy sometimes answer well, and the patient may at once feel relief and fall asleep afterwards; but very frequently any stimulant of this character aggravates all the symptoms, and I now never resort to it unless the patient is pale and exhausted. An active aperient pill given the night before the attack is threatening, or an ounce of the compound decoction of aloes, will often avert the pain altogether after two or three actions of the bowels (Form. 43), if the patient will remain perfectly quiet in her room the next day, and take the lightest diet, and carbonate of ammonia, potash, and quinine in effervescence (Form. 44); but if she persists in getting up and resuming her duties, the mind is put upon the stretch too early, and headache returns in its worst forms.

When the headache is coming on, and the patient is irritable and can obtain no sleep, a mixture of bromide of potassium, sal volatile, and camphor-water may be given with great advantage (Form. 26).

If the patient too is in any way excited, as the attack threatens, and there are transient *flushings* of the face, and a sense of overpowering heat and faintness (by no means uncommon in women at the climacteric period), a full dose of bromide of potassium will be extremely beneficial by allaying the mental disquietude and subduing the excitement on which the distressing symptoms depend. If it is given at the right moment, before the headache has set in completely, it will frequently arrest

the approaching paroxysm altogether; the patient will fall into calm sleep, and wake up well, provided she will aid the cure by absolute repose.

Valerianate of zinc is a remedy which often proves serviceable in nervous headache, if there is no sickness, and if the pain is chiefly on one side of the head. It is a powerful nervine tonic, and may possibly exert some physiological effect on the nervous centres. It may be given alone in the form of a pill, or with quinine or rhubarb (Form. 87). If the headache is associated with anæmia, it may be ordered in combination with sulphate of iron (Form. 97). The late Dr. Symonds was in the habit of prescribing oxide of zinc, extract of valerian, and extract of hyoscyamus together;* and Dr. E. Liveing quotes a case of paroxysmal headache completely cured after the administration of twenty-four grains of valerianate of zinc.†

Oxide of zinc alone has been found of use in a few cases (Form. 98). Oxide of silver in half-grain doses, with two grains of extract of hyoscyamus in a pill at bedtime, effectually removed an obstinate nervous headache due to irritation of the sympathetic nerve, after the failure of other remedies.

Full doses of hydrochlorate of ammonia are also to be mentioned as deserving a trial in these cases, when the physician is driven to his wits' end (Form. 27). If the pain is chiefly confined to a spot or small space on one side of the head, belladonna or aconitina ointment may be rubbed into the temple at the same time (Form. 110–

* Gulstonian Lectures on Headache, in Medical Times and Gazette, 1858, vol. xvi, p. 496.

† On Megrim and Sick Headache, 1873, p. 448.

113), and quinine persevered with, as in the neuralgic variety of the affection. When quinine causes headache, it is well to combine it with hydrobromic acid* (Form. 14). I am in the habit of prescribing, with much advantage in these cases, the bromide of potassium and tincture of quinine together (Form. 13), and I am fully satisfied that the headache and nervous excitability would have increased by the employment of the quinine alone.

I knew, many years ago, a young lady who obtained relief from a nervous headache by drinking a tumblerful of warm water twice or three times a day, and this she sometimes did with equally good effect at mealtimes.

The inhalation of chloroform in acute nervous headache sometimes controls the severity of the paroxysm, and induces sleep; but if there is any nausea it is rarely of service, and usually provokes vomiting, which distresses the patient and increases the suffering.

Guarana has not proved a successful remedy in the few cases in which I have employed it, but many medical men have borne testimony to its efficacy on the first symptoms of headache making their appearance. It may be given in doses of 15 or 20 grains in water with an equal quantity of sugar, and repeated in half an hour if it does not afford relief. Dr. Latham speaks well of it when there is glimmering in the field of vision, pain in one temple, and nausea or vomiting.† Dr. Wilks also gives testimony in favor of it.‡ As it appears to stimu-

* The formula for preparing the hydrobromic acid is given in a short paper by Dr. J. Milner Fothergill in the British Medical Journal, July 8th, 1876, p. 40.

† Dr. Latham, on Nervous or Sick Headache, p. 69.

‡ Medical Times and Gazette, January 2d, 1869.

late the vasomotor nerves, and so to diminish the supply of blood to the brain, it would have no good effect, probably, in the early or premonitory stage, when there was disturbance of vision; but at a later stage, if the headache is severe and attended with throbbing of the temporal arteries, it may succeed when the bromides and other remedies fail. This remedy is also of service in the genuine neuralgic headaches (hemicrania).

When, in a case of this character, the face is pallid and the pulse weak and slow, and the patient is beginning to feel the want of sleep, there is no remedy equal to the hypodermic injection of morphia.* It may be always used with the greatest safety if the quantity is small to begin with, and the patient needs sleep. Nothing has so realized my expectations in those pure forms of nervous headache, where I think it more likely that the nervous centres are in a state of extreme susceptibility than that the calibre of the vessels is changed. If it does not completely remove the pain, it induces sleep, or gives that amount of repose which renders the patient indifferent to all that goes on around him; and in this way the brain gets rest from those harassing thoughts and miserable speculations which haunt the poor sufferer, and from which there is no escape. I repeat what I have elsewhere written, as it bears on

* "The quick and powerful action of morphia and other narcotics, when injected beneath the skin, affords a familiar illustration of the fact that a current of liquid is constantly passing from the tissues into the blood; the blood being, of course, the vehicle by which the absorbed morphia reaches and acts upon the nervous centres."—"On Certain Physiological Phenomena connected with the Circulation, Respiration, Secretion, and Nutrition," by George Johnson, M.D., F.R.S., in *British Medical Journal*, January 1st, 1876, p. 7.

some points under consideration.* When the sickness and prostration are extreme, and nothing can be retained on the stomach, not so much as a little iced water; when the extremities are cold and the pulse feeble; when there is intolerance of light and sound, and the patient has been days without getting any relief; the one-sixth of a grain of acetate of morphia for an adult will be sufficient to insure sleep, and the patient will wake up without headache, if not well. Sometimes the addition of the 80th to the 40th of a grain of atropia will exert an antagonistic effect, and combat the tendency to sickness which morphia alone frequently excites (Form. 116).

In cases of nervous headache I have lately used the hypodermic injection at once, without waiting for the effects of other remedies, and seen immediate relief follow. I would urge the employment of the remedy when the patient is distracted with agony, though the pulse be slow and weak, and the features collapsed. There will be no risk of employing it at this stage of depression, if the sufferer has been accustomed to the subcutaneous injection of the drug. On one occasion I found that, after a few hours' rest and repose (during which time the surface becomes warmer and the pulse improves), the pain and sickness returned, but with less intensity; then, after retching had continued some few minutes, the stomach was able to retain a teaspoonful of brandy and two ounces of soda-water, after which the patient fell asleep for several hours. This treatment has cut the paroxysm short, and recovery has been much more rapid; the terrible confusion of ideas and nervous excitability

* On the Treatment of Different Forms of Headache, in The Lancet, vol. i, 1875, June 19th, p. 854.

have been prevented, and the prostration after the attack has not been so tedious and lingering. I consider, however, that the system tolerates the injection better at a more advanced stage, when the excitement is abated, and the patient is worn out for want of sleep.

In the intervals of the suffering we may reasonably expect to mitigate the severity and frequency of the paroxysms, provided the patient can and will carry out our instructions.

When a severe headache has passed off, the stomach is often deranged from the remedies employed or the sympathetic disturbance set up in the various organs. Here an alkali, with the aromatic spirit of ammonia and a vegetable bitter, has a good effect (Form. 45), and a mild aperient pill at bedtime (Form. 99), particularly a small quantity of iron with aloes and myrrh, to empty the large bowel (Form. 85–86).

When the tongue is clean and the secretions are in proper order, iron in effervescence is a valuable remedy twice or three times a day after food, and sometimes strychnia may be added to improve digestion and accelerate the capillary circulation (Form. 46). In the case of women, where the menstrual functions are deficient and the bowels sluggish, five grains of the iron and aloetic pill of the British Pharmacopœia (Form. 85) will answer well, whilst the nitromuriatic acid in infusion of quassia, with small doses of strychnia, may be employed during the day, or the tincture of nux vomica, which answers better with some persons (Form. 47–48). A dinner pill, given daily before luncheon, will sometimes prove of great service (Form. 77), or one or other of the formulæ (78–100–101).

In cold weather, if the nutrition of the body is much impaired, cod-liver oil will be found of great service, and a teaspoonful may be given, after the two chief meals of the day, in a little of Morson's pepsin wine or orange wine. But fresh air, exercise, and relaxation of mind and body are the chief remedies on which to rely.

CHAPTER VIII.

NERVO-HYPERÆMIC HEADACHE.

Condition of the Cerebral Vessels, and Diagnosis from Nervous Headache—Most common in Men who indulge in Stimulants and whose Brain is overworked at the same Time—Symptoms indicate Nervous Exhaustion, with Depression of Spirits and Loss of Appetite—Excitability of Manner and Annoyance from Trivial Causes—Frequently met with in Young Persons of both Sexes—Use of an Emetic—Aperients—Alkalies—Occasional Utility of Opium—Bromide of Potassium and Chloral.

I INTEND by this term to imply a form of headache in which the nervous element is concerned, and the vessels of the brain are overloaded and in a state of vascular irritation. It is by far the most common form of congestion, and fully one-half the cases that seek relief are to be classified under this head; at least this holds good with male subjects. At one stage or another the nervous headache indicates that the vessels of the brain are congested, because it is liable to paroxysms of severity from any excitement or noise, hot rooms, or eating and drinking. There is not the same amount of prostration and helplessness, which are the striking features of the nervous headache. It belongs to persons whose circulation is excitable, and to those who are impulsive and undisciplined, or who, from the force of circumstances, have no alternative but to work on and abide the consequences.

It is met with in men whose brains are overworked, and whose meals are hurriedly taken, especially if at the same time they indulge freely in wine and spirits, and do not get a full allowance of sleep. These persons are liable to flatulence; they have a coated tongue in the morning, and a dry unpleasant taste in the mouth; the breath is hot and offensive, and there is thirst and a total loss of appetite. Such persons go on working against time with an ardor and zeal which they feel to be irresistible. They appear to know that the speed with which they are carried along is detrimental, and that soon they must yield in the contest; and yet, unless they give up work altogether, they have no power of moderation. Control is gone. This condition of the brain makes men really nervous; if they can be convinced of the mischief that may come, they slacken the speed for a time, and in some instances when they find the weight of the symptoms pressing upon them the reckless fortitude is abandoned for complete surrender, and the whole aspect of the man's manner and life is changed.

With this exhaustion, and partial or general congestion of the brain, there is great nervousness, with lowness of spirits and depression. The appetite, however, in many cases is natural, and the sleep may be good, or, what is more common, the patient feels inclined to sleep after dinner, but when he gets to bed is wakeful and restless, turning about from side to side; his mind is busy with strange ideas, or he is morbidly solicitous about himself or others. Then in the morning he wakes unrefreshed and eats his breakfast in a hurry. If he is vexed or annoyed, he can scarcely prevent himself from going into great passion and rage. He feels a rush of blood

to the head, and a passing sensation of momentary unconsciousness. His scalp is hot, the capillaries of the face injected, and the eyelids are wearied and tremulous. For the rest of the day (and for some time afterwards, it may be) his legs and knees feel as if they would give way under him, and he does not walk securely. If he has been in the habit of riding, he has no confidence in the saddle, and any sudden movement of the horse drives the blood to the face and head. Such a patient as this may pass an excessive quantity of lithic acid in the urine, especially if he is of gouty or rheumatic diathesis; but it more frequently happens that the urine is copious and clear, of acid reaction, and of low specific gravity. In one patient, whose case chiefly furnished these remarks, the urine contained a copious quantity of phosphates, when the headache and nervousness were severe; and I never noted their absence with this state of the head.

A good example of this headache is also seen in women at the change of life, whose constitution till this time has been sound and good, and the mind properly balanced. The catamenia have been regular up to the age of forty-five or thereabouts, and then somewhat suddenly they have become sluggish, or irregular and scanty. At each returning period there has been headache across the forehead, and weight over the eyes. The patient complains of flushes of heat, and the head and scalp are hot. Any allusion to her condition drives the blood to her cheeks, and a dry skin is succeeded by a hot oppressive perspiration, with faintness and languor. She sleeps badly, and sees dark spots before her eyes; she cannot concentrate her attention on her household duties; and her children vex her, and easily put her out. She is made jealous and

excitable without reason and magnifies into questions of great moment trifling circumstances, to which at other times she would not pay any attention.

There are many cases of mixed headache, happening to young persons of both sexes, and due as much to cerebral hyperæmia as to nervous disturbance. The cheeks are flushed, the eyes suffused, and the patient is compelled to lie down and discontinue the duties of the day. The symptoms cannot be attributed to a gastric origin, for the tongue is clean, the pulse is quiet, and there is no indigestion. Here the vasomotor system is at fault, and the cerebral vessels are relaxed. Remedies like strychnia and gentian, the mineral acids, and iron (Form. 47–53) are more serviceable than depletion, which, by weakening the nerve-force, would further increase the excitability of the cerebral tissue. A careful discrimination of these cases, which may well baffle a shrewd observer, is very necessary, and successful treatment depends on a correct diagnosis.

As regards treatment, a mercurial pill followed by an effervescing aperient saline, will often cut short the attack (Form. 18–81–61). Three grains of blue pill when the headache is threatening will sometimes get rid of the misery in a few hours, and the fixed alkalies, as bicarbonate of soda or bicarbonate of potash, will also be of service, by relieving the acidity of the bowels. It is a good plan to get the bowels to act promptly, and this may be promoted by soap and water enemata. Where there is much throbbing of the temporal arteries, and the patient feels nausea on turning round, or going into a warm room, an emetic of ipecacuanha or sulphate of zinc (Form. 108–109) will act in a marvellous manner; and even if there is

no food in the stomach whatever, the effort of vomiting relieves the congestion of the liver and duodenum, and the headache departs. In this class of cases, where there is hot burning headache, with cold hands and feet, depressants of the circulation are valuable remedies, and among them aconite (Form. 106) may be selected, from its power in dilating the contracted vessels of the extremities.

During the acute attacks we are powerless to do more than this, and when they pass away and the patient resumes his ordinary habits, he feels as well as at any time of his life. In cases where the headache lingers, or returns from slight excitement or fatigue, the ordinary treatment would consist of bromide of potassium with laxatives or a bitter stomachic twice a day (Form. 68), and if there is acidity and flatulence, the subcarbonate of bismuth, in full doses half an hour before meals (Form. 107), will be found of value. I have often seen great benefit derived from bromide of potassium or ammonium, with small doses of sal volatile, taken on first getting out of bed. As a sedative at night, where the patient rests badly, bromide of potassium alone (Form. 40) or in combination with hydrate of chloral, is the best (Form. 67). I do not think tincture of opium should be ventured on in these cases, particularly if the pulse is at all hard or incompressible; but where it is soft, and of average frequency, I have known a few drops of nepenthe (Form. 69), given with bromide of potassium or hydrate of chloral, tranquillize the patient and promote refreshing sleep. As long as the headache persists, a non-nitrogenous diet and abstinence from stimulants ought to be observed.

I know an unmarried lady, thirty years of age, who

thinks she would lose her senses if she did not take a full dose of chloral (Form. 70) when the headache is severe. It relieves the pain quickly, and on comparing this case with that of a patient (much her senior in years) who gets relief from the hypodermic injection of morphia, I find the effects of the two agents very similar in the comfort and undisturbed sleep that ensue. But the two headaches are due to different pathological conditions,—in the one the maddening pain is as much owing to increased vascularity of the contents of the encephalon as to a morbid excitability of the nerve-centres; in the other the nervous system is primarily and chiefly at fault, and hydrate of chloral would further rob the brain of its defective blood-supply. The action of chloral is not always to be explained in these complicated cases. A young person who enjoys good health in the intervals of the attacks of headache, suffers no continued inconvenience from an occasional dose. The system soon rallies from any depression it might induce, but persons should be warned not to fly too frequently to this nerve-depressant, nor to take it at random without any regard to preventive treatment in the intervals of suffering. Chloral is taken for all kinds of headache by many, who get relief in the stupor and drowsiness which follow, and although they may resort to it from time to time, without experiencing any immediate ill effects, they are nevertheless, in many cases, injuring their nervous tissue where it is frequently resorted to. The action of chloral is double: in the first place, it acts directly upon the nerve-tissues themselves, lowering their activity; in the second place, it depresses the circulation and the respiration. Chloral kills by paralyzing the respiration and the circulation (H. C.

Wood). In non-lethal doses, chloral by its double action produces chronic starvation of the brain-tissues; not only that, but there is danger in its continued use, as not rarely, under these circumstances, a fatal result has followed from depression of the circulation and respiration produced by the ordinary doses. The condition of the brain becomes more and more debilitated under frequent resort to it, and the excitement gives place to a state of mental lethargy and inaptitude, accompanied by irritability, which lays the foundation of perverted nutrition, and such changes in the nerve-centres as in the long run encourage serous effusion, and the waste of brain-structure. In those cases where chloral furnishes great relief during the acute attack, it is well to give nervine tonics during the intervals by means of quinine, strychnia, phosphorus, and iron (Form. 14–21–24); taken regularly at these times, the nutrition of the brain-tissues is improved and the attacks are rendered less frequent and less severe. Such treatment during the interval is in no way incompatible with the use of chloral during the acute attack.

CHAPTER IX.

TOXÆMIC HEADACHE.

Headache of Fever owing to the Action of Poisoned Blood on the Nerve-centres — Character of Headache in Acute Fevers — Relapsing—Typhus—Simple continued—Enteric—Whooping-cough—Measles—Scarlet Fever—Variola—Malarial Poisoning —Uræmic Headache—Headache from Gas-poisoning—Symptoms and Treatment — "Body-snatchers' Headache" — Local Abstraction of Blood—Leeches—Cold Affusion to the Scalp—Ice-cap—Quinine — Ammonia — Antimony — Opium — Case of Headache from Malarial Poisoning—Arsenic and its Constitutional Effects in continued Doses—Phosphorus—Cod-liver Oil.

It will be well in the first place to consider under this category the headache of fever, which I have elsewhere termed febrile headache.* The pain is attributable to an alteration in the constitution of the blood and its component parts; this causes a morbid sensibility of the nerve-centres, and induces congestion of the vessels and membranes of the brain. When the absorption of the fever poison into the system has taken place, every tissue through which the blood passes is impressed by it, and one of the most constant indications of its pernicious effects is headache. Headache is present in the simple fever of common catarrh, when the frontal sinuses are congested, and the lachrymal glands pour out an abundant secretion. It is a striking symptom in influenza

* See Diseases of Children, and Chapter XVI.

and frequently recurring colds, when there is prostration of the strength, and the nervous power is reduced. The sudden impression of cold or atmospheric poison may exert an influence on the fifth nerve, at its origin in the brain, through the branches of the ophthalmic nerve, springing from the Gasserian ganglion. In the chapter on Sympathetic Headache, I have already alluded to this extensive nerve communication, along which morbid impressions are so readily conveyed.

In acute fevers headache is rarely absent. With respect to its relative frequency, Dr. Murchison has noted that, of ninety-two cases of typhus, headache was complained of in all but six. Dr. Henderson found it in 150 out of 159, and Dr. Stewart in a large number of cases.* The pain generally occupies the forehead and temples; it is of a dull heavy character, and is attended with giddiness and confusion of ideas. In young and strong children the pain is intense, and frequently forms the most prominent and leading feature of the disease. When it is acute and distressing, it is often associated with great restlessness, flushing of the countenance, and injection of the conjunctival vessels. If this state is overlooked or neglected, it may lead to delirium and profound somnolence, from which the patient cannot be roused.

In relapsing fever, headache is a common and early symptom, and is more darting and throbbing than in typhus.† In typhoid fever, headache is also a frequent symptom, both in adults and children. Dr. Murchison ascertained that it existed in seventy-seven out of eighty-

* Murchison, On Continued Fevers, 1862, p. 150.

† Murchison, On Fever, 1862, p. 345.

two cases, and M. Louis in all but seven out of 133 cases.* The pain resembles the headache of typhus in its dull continuous character, and in its usual limitation to the forehead; but the mental faculties are rarely impaired, and delirium is exceptional. In simple continued fever, and that variety known as ephemera, headache is more or less present; and in some forms of the same disease, where the duration of the fever is longer and more intense, it is relatively more acute than in either typhus or enteric fever.† The poison of malaria gives rise to a severe type of headache, either anteriorly (frontal), posteriorly (occipital), or on either side (hemicrania). We meet with headache, again, in whooping-cough and scarlatina, in variola, measles, etc.; in fact, in all those diseases in which a toxæmic condition of the blood exists. Headache is also frequently found in some acute local inflammations, as pneumonia and pericarditis, and the treatment should be determined by these respective lesions.

There is no specific febrile or inflammatory disorder which does not create some morbid impression on the brain, and in many instances, as we have seen, the cerebral cells become irritated and disturbed, till the inflammatory affection passes away.‡

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* Ibid., p. 487. † Ibid., p. 600.

‡ It does not appear that the intensity of the cerebral symptoms in typhoid fever in adults, or in extreme cerebral congestion and tubercular meningitis in children, bear any relation to the morbid appearances found after death. In some fatal cases, when the head symptoms have been trivial, extreme vascularity of the membranes has been discovered, and the vessels and sinuses of the brain have been gorged with dark blood; whilst in other cases, when the head symptoms have been severe, and there has been delirium and even

I might reasonably have included the headaches of gout, rheumatism, and syphilis under this name, seeing

convulsions in children, no sign of inflammation could be detected, but considerable effusion of serous fluid into the lateral ventricles and beneath the arachnoid. A large quantity of intracranial fluid is not infrequent in typhoid, and as regards the substance of the brain itself it is more frequently found normal than otherwise. In typhus fever the same rule obtains, viz., that in the absence of severe cerebral symptoms during life, abnormal vascularity of the membranes of the brain may be detected after death. In both these diseases the cerebral congestion is not greater than may be found to exist in cases of severe pneumonia or bronchitis, or any disease which has impeded the pulmonary circulation. There is no sign of inflammation, and the congestion is of a passive rather than of an active character. The transparent and often colorless serum which is found in the ventricles, and beneath the arachnoid, is rather more common among the morbid appearances in typhus than it is in typhoid. A few albuminous flakes are occasionally present in both diseases, but there is no genuine lymph or exudation corpuscles in either—no products we can term inflammatory. The subarachnoidean serosity and the fluid between the convolutions and the sulci are well marked, and this large amount of fluid, although not indicating any inflammation, does assist in explaining the severity of the cerebral symptoms during life. In young children of rickety constitution, when the head is growing unusually large, the convulsions and comatose condition have, in my experience, borne a close relation to this excessive secretion of fluid. Yet most physicians will declare that, when the amount of fluid is trifling, the cerebral symptoms are as great as when the quantity is excessive. The symptoms are chiefly attributable to the altered quality of the blood, and the elevation of its temperature in the cerebral vessels. In relapsing fever the same remarks apply without exception; there is no constant relation between the cerebral symptoms and the state of the brain and its vessels. The vascularity of the membranes and the serosity in the ventricles do not in any way explain the head symptoms during life, and there is no proof whatever that the brain or its membranes are liable to be inflamed in consequence of the fever process. The inference is that the headache of fever is essentially dependent on the presence of the specific poison in the blood, and the accumulation in it also of the products of tissue change,

that the accumulation of morbid products in the blood impairs the nutrition of the nervous tissue, and originates pain and suffering; but although these headaches are sympathetic, and secondary to the constitutional state which calls them forth, I think a separate classification is advisable for the varieties depending on the special affections to which I have alluded.

A form of headache due to toxæmic change (*uræmic headache*) now and then occurs in connection with disease of the kidneys, when their secreting tissues are impaired, and they are no longer able to separate the excrementitious matters from the blood. They may act energetically for a time, but at length the morbid material in the blood ceases to exert a diuretic influence, and degeneration in their structure takes place. In a little girl, aged ten years, who came under my care in 1875 with acute desquamative nephritis and anasarca, the headache was most inveterate, occupying the entire forehead, and continuing for days together. When the local congestion had subsided, and the urinary secretion had increased in quantity, she obtained relief; but if any animal food was taken, even in the shape of beef tea, it renewed the headache by still further impairing the functions of the eliminative organs, and causing on two or three occasions

which are not eliminated by the proper channels. The nutrition of the brain suffers in consequence of this detention, notwithstanding the wide difference in the nature of the respective fever poisons. Hence it is that the nervous system generally becomes oppressed, and the sympathetic partially paralyzed.

As a matter of clinical experience I am informed by Dr. Broadbent that protracted headache in the early stages of enteric fever denotes unusually severe affection of Peyer's patches, and is often followed by hæmorrhage at a later period.

severe hæmaturia. Active aperients from time to time, and a diet consisting exclusively of milk, were the chief remedies trusted to. In the case of a man, 64 years of age, who came under my care in 1864 with chronic Bright's disease, the frontal headache was insupportable, and lasted, without intermission, from the day of its commencement to his death, a period of many months. The slow accumulation of urea in the blood (uræmic poisoning), from gradual degeneration in the kidneys, rendered all attempts at relief abortive. The most restricted and careful diet, with purgatives and stimulating diaphoretics, only produced temporary benefit. Where the cause cannot be removed there is little to be gained from any plan of treatment. When he became anæmic, a few drops of the tincture of the perchloride of iron were tried; but no relief was obtained, because the blood became more and more contaminated, in consequence of the increasing destruction in the secreting apparatus of the kidney and the absorption of the urinary ingredients. As usually happens in these cases, drowsiness and stupor came on, and the patient died comatose from uræmic poisoning.

The headache may be the first sign that the kidneys are damaged, and the indications are to remove the excessive amount of urea from the system. Put the patient on a milk diet, and give no animal food or stimulants of any kind whatever, or the congestion of the kidneys will increase, and blood appear in the urine. The action of the kidneys will be promoted by giving acetate or citrate of potash and digitalis (Form. 1–2), or the same salt with spirit of juniper and decoction of broom. Cream of tartar drink (tartrate of potash, Form. 3) will mildly ex-

cite the action of the renal organs, as well as freely open the bowels, and unload any obstruction of the portal system. Diaphoretics, hot-air baths, etc., are useful at the proper time, by assisting the elimination of urea through the skin. If the headache is severe, and there are convulsions, with a scanty discharge of concentrated urine, venesection or cupping over the loins may be demanded to save the patient's life. If anasarca comes on, and there are indications of cerebral œdema or effusion into the ventricles, then the digitalis and citrate of potash mixture will be required to rouse the flagging action of the heart and kidneys. Where anæmia has been complicated with the anasarca at this stage, and the blood gets gradually thinner and more impoverished, I have found minute doses of the bichloride of mercury, with the tincture of perchloride of iron, of great service (Form. 4). It relieves renal congestion by favoring the escape of exudative products from the urinary tubules, and in this way it increases the diuretic action of the kidneys, and improves the vitiated state of the blood at the same time. Under this treatment I have witnessed every trace of anasarca disappear, and the headache depart entirely.

I cannot dismiss this character of headache without considering the effect which toxic agents have on the blood and nervous system, when the atmosphere is vitiated by crowded assemblies or the imperfect ventilation of apartments. I believe that the accumulation of carbonic acid and expired air in school and lecture-rooms is to be reckoned among the chief exciting causes of headache in young persons, and still more in adults when the nervous system becomes more susceptible with the advance of years.

"The normal quantity of carbonic acid being .4 volumes per 1000, it produces fatal results when the amount reaches from 50 to 100 per 1000 volumes; and, at an amount much below this, 15 or 20 per 1000, it produces in some persons, at any rate, severe headache. Other persons can inhale, for a brief period, considerable quantities of carbonic acid without injury; and animals can be kept for a long time in an atmosphere highly charged with it, provided the amount of oxygen be also increased. In the air of respiration, headache and vertigo are produced when the amount of carbonic acid is not more than 1.5 to 3 volumes per 1000; but then organic matters, and possibly other gases, are present in the air, and the amount of oxygen is also lessened. Well-sinkers, when not actually disabled from continuing their work by carbonic acid, are often affected by headache, sickness, and loss of appetite, but the amount of carbonic acid has never been determined."*

Facts like these attest the danger of continually breathing an atmosphere vitiated and overcharged with carbonic acid. The dangerous consequences are first made manifest in the reduction of the force and frequency of the heart's action,† and in the enfeeblement of the whole capillary circulation, which causes the brain gradually to become exhausted from the diminished quantity of blood it receives, and then follow headache, languor, and incapacity for sustained mental exertion.

When the amount of carbonic acid in the atmosphere

* Practical Hygiene, by Dr. Parkes, 1873, 4th edition, p. 112.

† Cyon brought a frog's heart to a standstill by passing through it serum charged with carbonic acid; on removing the carbonic acid from the serum the heart began to beat again.

is large, the requisite elimination of it from the lungs does not take place, and the blood, becoming more venous and impure, fails to impart its accustomed stimulus to the cerebral vessels, which now fall into an atonic state; while the normal amount of oxygen in the blood is replaced by the retention of the gas, and a diminution of vascular pressure.

In one form of headache the symptoms appear to have arisen from gas-poisoning, *i. e.*, gas generated by putrefaction, fecal fermentation absorbed into the blood, and thus producing its effects upon the brain and spinal cord.

This form of headache often commences with a feeling of heaviness and dulness the first thing in the morning, and gradually increases till the middle of the day, when it may be temporarily relieved by luncheon; but it soon reappears and increases through the afternoon and evening, unless relieved by treatment.

In the head there is a sense of heat, weight, and dulness, and nervous prostration and inability to apply the mind to work, or to make any physical exertion—the legs seem to lose their power more or less.

The tongue may be quite clean, or have a little white coating; but it never has the thick yellow fur at the back and sides, always present in the bilious headache.

Treatment.—The only remedy is a drastic purge, in a fluid form to insure rapidity of action. This brings away a fetid evacuation, with the escape of extremely offensive gas, generated by the putrefactive fermentation which has taken place instead of healthy digestion. Senna, aloes, Tamar-Indien, syrup of buckthorn are amongst the most useful remedies. Saline aperients are utterly useless, as they fail to bring away the offensive gas, and

only produce watery evacuations—a little saline may be usefully combined with the drastic, as quickening its action and allaying any feverish condition, but the drastic must be relied upon and its effect obtained. Stimulants are decidedly injurious.

This form of headache with gas-poisoning very much resembles the headache from gas-poisoning by sewer gas, from decomposed bodies in the dead-house and dissecting-room. The old "Body-snatchers" were quite familiar with it.

My friend, Mr. W. Adams, informs me that in the year 1842, and for some few years afterwards, when he used to make the post-mortem examinations at St. Thomas's Hospital, he had as a dead-house assistant a well-known man who had been one of the leading body-snatchers for many years, and he told him that when doubling up a body and putting it into a sack, the body-snatchers always turned their heads away, and were extremely careful not to inhale any of the gas which generally escaped from the stomach of the body when bent. If a body-snatcher should "get a gulph," as he expressed it, he knew it would be followed by headache and nervous depression from gas-poisoning, and he had learnt from experience that these symptoms would be increased by gin or brandy, to which he would naturally resort. This man told Mr. Adams that on these occasions he always avoided spirits, and took two strong pills as soon as he got home. Thus he had learned that the eliminative treatment by a drastic purge was the only reliable means of curing the headache and depression produced by gas-poisoning.

In the *treatment* of the forms of headache arising from specific fever, careful judgment will be required. When

the brain is oppressed by the high temperature of the blood, and the accumulation of effete and poisonous matters within it, there is imminent danger to life, if this state of things is permitted to go on unchecked. The local abstraction of blood is a measure to be held in recollection, seeing that it has sometimes averted the most threatening cerebral symptoms. It removes the extreme venous tension, and, by promoting a free action of the skin, brings down the temperature. Three or four leeches applied to the temples will act in a most efficacious manner, and relieve the patient more completely and quickly than any other remedy at our command. Cold affusion to the scalp, or the application of the ice-cap, may, in ordinary cases, render their employment unnecessary, but the abstraction of blood is sometimes the only chance of subduing the pain, and amending the patient's general condition. In the headache of aged and feeble persons, who are struck down by fever, warm fomentations appear to be of service. They were used by the late Dr. Graves, and sanctioned by Dr. Murchison.* It must be understood, however, that there is the headache of exhaustion which succeeds sleeplessness, and is independent of any inflammatory condition of the brain or membranes. For this state, quinine, ammonia, opium, and antimony may be demanded to restore the equilibrium of the brain, and to mitigate the nervous agitation which is associated with it.

In the headache due to malarial poisoning a full dose of quinine will be advisable, if it is periodical in character. As large a dose as gr. x or gr. xv has been recommended

* Loc. cit., p. 274.

before the attack, and it may be necessary to push it to cinchonism in divided doses, and then gradually diminish the dose (Form. 5).

The following is a severe case of malarial poisoning and hemicrania.

J. R., æt. 49, m., sallow, tall, and corpulent, consulted me July 3d, 1877. Has lived in Bombay for twenty-five years, and had good health till nine years ago (1868), when he got headache diffused over the forehead. Two days later, he had a bilious attack—violent spasms, retching and bringing up large quantities of bile, passing it by the bowels as well. The attacks came on once or twice a week, and the doctors ascribed them to malaria. There were new drainage works going on, which his duties called upon him to superintend. After suffering more or less for fourteen months he went to Australia, and there lost his headache; but on his return to Bombay he suffered again, within six or eight weeks.

In 1870 he was ill again, and, in consequence, came to England, and lost his bilious attacks, but not his *headache*. His wife, who was with him in India at the time, became subject to similar attacks, and it is only recently that they have abated in severity.

In November, 1872, he returned to Bombay, and was as bad as ever; then he suffered from 1872 to July, 1877, and for some time took forty-five grains of quinine in three doses daily for *one month;* the effect was to keep off the headache for *one year*, during which time he felt well; the urine was clear, and the motions healthy. When the headache was bad, heat or cold applied over the eye would give relief; occasionally there was pain

in the right eye, and insupportable depression of spirits accompanied it.

In 1875 he came to England again for three months, and derived considerable benefit; returned in November, and after being a month in Bombay the spasms, vomiting, and headache returned in all their former severity. He took ipecacuanha, which made him sick and ill; and since then he has had no vomiting, but severe headache, extending through the left eye and temple, which would find its escape through the left shoulder. He was worst at noon, when the sun was at its height; generally the pain would begin at 3 A.M. and last until 7 P.M., when he fell asleep, and woke up relieved in a few hours; a cup of tea or coffee would sometimes relieve the pain quickly. Heavy sleep and snoring were invariable precursors of an attack. During the last year, his memory, which was formerly acute, has become very defective.

There is no disease of the heart, liver, or spleen; abdomen very large and flabby; he is now fidgety and irritable, and cannot bear the least noise or excitement; he looks pallid and sallow; pulse 96; tongue clean; bowels free; urine clear, reaction acid, sp. gr. 1020, non-albuminous. He has taken tincture of gelseminum, croton chloral, and bromides, without benefit. He was now ordered arsenic, quinine, and bromide of potassium twice a day in a mixture, and a dose of Friedrichshalle water in the morning, twice a week. The diet was to be plain and simple, with a little claret and water with his meals; cheese, pastry, and tea to be avoided.

July 9th. Has had some headache over the left eye, but not so piercing or severe; he caught cold a few days

ago, which he considers a sufficient cause. The bowels not having acted satisfactorily, he was ordered to take two pills of aloes and myrrh, with half a grain of sulphate of iron (Form. 86).

July 12th. He is much better, and has had no headache since the last visit. Two pills acted well, and produced two motions; urine clear; he feels stronger and not worried with anything or anybody; pulse 84; free from pain entirely. His aspect is now clear and animated.

July 17th. On the 15th, 16th, and 17th headache began at 3 and 4 A.M., and lasted till 8 and 9 A.M., each morning. It commenced over the entire brow, forehead, and eyes; now it has extended to the left side of the head, and he has pain and tightness in the right side over the liver. The pain makes him emotional; he can scarcely avoid crying or being excited, and he often sheds tears when reading. The region of the liver is tender and its area slightly increased; the urine is turbid and high-colored. He was ordered a pill containing a grain of calomel at bedtime, a sulphate of magnesia draught in the morning, and citrate of potash with quinine in an effervescing mixture during the day.

July 25th. On the 22d he went to church, and there felt pain; on the following day it recurred; then on the succeeding evening had attacks lasting for some hours. This occurred for three evenings, and on the 23d did not get up till 6 P.M. The pain begins in the left eye, and then extends over the head, but he has had no shivering; he sleeps better, and is certainly improved in all respects. A mixture of citrate of iron and arsenic

was now ordered to be taken twice a day, after food, when free from headache, and the bromide mixture when an attack was threatening (Form. 26).

July 30th. His head had been better, but two mornings since he had acute pain over the liver, sudden and piercing, and this he has experienced in Bombay. There are no physical signs of hepatic congestion; the urine is clear, and the bowels free. The iron mixture seems to exert a slightly aperient effect.

August 14th. He had no attack whatever till the 10th, when it began in a moment at 4 P.M., and continued all day and night. On the 11th the pain was better in the early morning, then it returned at 1 P.M. and lasted all night. Before the attack of headache comes on the urine is always cloudy and thick, and when it passes away it becomes clear. This periodicity in the headache suggests the use of quinine in large doses, and therefore the previous medicines were discontinued, and two pills, each containing three grains of quinine, were prescribed twice a day.

September 26th. A month's residence at the seaside improved his general condition, but he had three attacks, two mild and one severe. He took quinine only when the pain was on him.

October 6th. On returning to town a few days since he got an attack of headache, which seized the forehead at 3 A.M., and then settling in the right temple and eye, gradually passed up to the top of the head, where, as a heavy weight, it would last for hours. I now gave a phosphorus capsule (gr. $\frac{1}{30}$ daily) and quinine and iron in a mixture; in addition, as the patient was corpulent,

a Turkish bath was ordered once in ten days, and a dose of Friedrichshalle water twice a week.

December 11th. The patient reported himself quite well in health, and his general appearance and manner fully bore out his testimony, for he was now active and energetic, and most desirous to return to his duties in India. He had in a great measure exchanged his sallow aspect for a fresh color, and his eyes sparkled with intelligence and vigor; he took long walks without fatigue, and went into society without experiencing any after ill effects. In February, 1878, he returned to Bombay quite well in health.

If the pain continue to recur in these cases, Fowler's solution and tincture of belladonna, in five-drop doses, are recommended by Dr. Smith, increasing the arsenical solution one drop each day (Form. 6 to 9). It may be advisable to persevere with this combination if phosphorus and quinine should fail. "I have witnessed the postponement and ultimate cessation of a periodic headache, through the influence of arsenic, before the prickling eyelid or silvered tongue demonstrated its agency" (Begbie). Arsenic is a remedy of the greatest possible value in nervous cases, if it is given judiciously and watched carefully, but it is too generally abandoned on the first symptoms of constitutional irritation becoming manifest, and when its alterative effects on the blood are about to be secured. Under these circumstances it should be suspended for a time, and then cautiously resumed. Every practitioner should make himself familiarly acquainted with the physiological signs of arsenical action, for the exhibition of small doses long together, in some persons of peculiar idiosyncrasy, is accompanied with so

much nausea and nervous depression, as to render the continuance of the remedy inadmissible.*

Phosphorus is another good remedy in nervous and neuralgic headache, and also in that form arising from the poison of malaria, as we have just seen, where the nerve-centres are depressed and exhaustion is the consequence of it. Its action is not unlike that of iron and cod-liver oil, and it is a constituent of many of the tissues, especially the nervous. I have now and then observed its beneficial effects after the failure of other well-known remedies, and therefore, in all obstinate cases, it should have a fair trial, as its general tonic effects in repairing the waste of nervous tissue are very marked, and in my experience it has occasionally produced the happiest results.

Phosphorus is one of the most important agents we possess in nervous exhaustion, and its efficacy is undoubted when administered in an unoxidized state, capable of being readily assimilated. No remedy requires more care in prescribing than this, for whilst in small doses it is a

* "Arsenic, when given continuously in moderate doses—say, five drops of the liquor arsenicalis, diluted largely with water, twice or thrice a day—will, sooner or later, generally within eight or ten days, produce increase of heat and dryness of skin, together with acceleration of pulse, followed by a sense of heat and itching of the eyelids, to which succeed swelling and tenderness; the conjunctiva becomes inflamed, the eye sensitive to light, and the orbits surrounded by a dark discoloration. The tongue at this time will be found finely coated with a white silvery film, resembling that produced by touching its surface with a weak solution of the lunar caustic. . . . The throat becomes dry and sore, the gums swollen and tender; and, if the medicine is still further persisted in, salivation ensues."—"On the Physiological and Therapeutical Effects of Arsenic," by James Begbie, M.D., F.R.S.E., in *Contributions to Practical Medicine*, 1862, p. 270.

gentle stimulant and tonic, in large doses it depresses the heart's action like chloral, and is not free from danger. It may be well to begin with gr. $\frac{1}{60}$, but I have seen no ill effects from gr. $\frac{1}{30}$; and thus, after a time, may be taken twice a day. I never exceed this quantity. Then as to the best mode of giving it. The Pil. Phosphori of the British Pharmacopœia is seldom ordered, as it is open to objections, which are now overcome by more recent modes of prescribing phosphorus in such a form as shall insure its activity. The Pharmacopœia pill, when made, is kept in water, and after a time it becomes extremely hard, and resists absorption in the stomach, passing through the intestines in an unchanged state.

As an excellent solvent of phosphorus, cocoa butter and Castile soap have been recommended (*Yearbook of Pharmacy*, 1876), to form into pills which will keep well, and retain their properties. Messrs. Squire recommend a formula composed of mutton suet, liquorice, and mastic. They consider it an excellent combination, as the virtue of the phosphorus is retained, while in this form it is taken up readily by the stomach.

The perles of phosphorus are an excellent form for administration. They appear to retain the virtues of the drug for an indefinite time, and to be readily digested and absorbed.

This leads me to say that the sugar-coated pills containing phosphorus are unreliable. I am told, on good authority, that the phosphorus is oxidized or volatilized by the necessary heat employed in the process. If there is a base such as oxide or carbonate of iron, or strychnia, it will form a chemical combination and become a hypo-

phosphite. Hypophosphites are made by boiling phosphorus with lime or soda.

Cod-liver oil, as in all forms of neuralgia, is sometimes of great service in hemicrania and neuralgic headache, if the opportunity is seized of giving it in the intervals of suffering, when the patient is free from pain. As in some cases of gastralgia, cod-liver oil brings relief, when ferruginous tonics and the most careful diet fail, so will it frequently ward off attacks of neuralgic headache by improving general nutrition, and strengthening the tone of the nervous system.

CHAPTER X.

ARTHRITIC OR GOUTY HEADACHE.

Sometimes, though not frequently, the Accompaniment of Acute Articular Gout — Illustrative Cases — Influence of the Gouty Diathesis—Affection of the Brain and Membranes in Suppressed Gout—Character of the Pulse and Heart's Sounds—Importance of exciting Action in the Eliminative Organs—Mercurials—Podophyllin — Alkalies—Salts of Lithia — Carbonate of Ammonia.

When the febrile disturbance is considerable, and the secretions vitiated, acute gout is now and then attended with severe frontal headache, and weight across the eyes. Many persons who experience periodical attacks of acute articular gout escape headache altogether; but others are not so fortunate. I should say from my own experience that headache is not a frequent accompaniment of gout, and that, whenever it is present, it is generally in those persons whose general health has been shaken by many previous attacks, and whose nervous system has suffered in consequence. One gentleman, who consulted me in 1867, stated that for upwards of twenty years he had been a martyr to gout, but that the last attacks had alarmed him from the severe headache which accompanied them, although the foot was swelled and inflamed, and the urine copious and free from albumen. The pain was frontal, obstinate, and depressing, and it continued for some days after the local inflammation had subsided. Carbonate of ammonia proved a reliable remedy; and

sometimes a stimulating draught, consisting of quinine, chloric ether, and camphor, was of great use in relieving the pain (Form. 16–30).

A gentleman, thirty-five years of age, who was suffering from his fifteenth attack of acute gout in May, 1876, consulted me for headache, which was a new symptom of his complaint. The right great toe was vividly inflamed and tender, and had been so for some days before I saw him. His nights were disturbed and restless (as they had been on many former occasions), but he was reluctant to attribute the headache to pain in the joint, or to want of sleep. As the urine was abundant and clear, and the bowels thoroughly open, I attributed the headache to the local pain and general weakness; and I prescribed the carbonates of ammonia and potash in effervescence, with small doses of colchicum. Under this treatment the local disorder soon subsided, and the headache departed.

Dr. Garrod mentions a very interesting case of gouty headache in a lady, sixty years of age, who consulted him for intense headache, from which she had suffered about seventeen days. The pain chiefly occupied the vertex and back of the head, and was somewhat periodic in character. There was heat and tenderness of the painful part. The affection was considered hysterical at first, but on the next evening the pain suddenly left the head, and the ball of the great toe became acutely painful and tender, swollen, red, and shining. It was a severe attack of acute gout. The occurrence of a second fit after some months was not preceded by headache.*

* On Gout and Rheumatic Gout, by A. B. Garrod, M.D., F.R.S., 1862, p. 515.

The influence of the gouty diathesis in exciting severe headache is well illustrated in the following case recorded by Dr. Begbie.* For the limitation of space at my disposal, I shall make no apology for abridging the details. A lady, aged thirty-five, of full habit and florid complexion, had suffered for many years from severe and lasting headache, which had defied the power of many and divers remedies. It was difficult to fix upon any variety of headache which had been observed to answer to the character of that which she presented. "It was not nervous or hysteric; it was not inflammatory or con-

* On Gout and the Gouty Diathesis in Contributions to Practical Medicine, 1862, p. 29, case xvi.

"It is somewhat difficult to class the several forms of intermittent headache with other affections of this kind; but those having lengthened periods of intermission may best perhaps be noted here. The equality of time often observed, even where the intervals extend to two or three weeks, or yet longer, is a very remarkable feature in these cases, and denotes a cause specific in its nature and uniform in its operation. I know instances where such intermittent headaches have occurred during the greater part of a protracted life. More frequently, however, it happens that they affect especially certain periods of life; in this, as in many other circumstances, showing singular relation to the disordered actions of the gouty constitution, with which, as I have stated in a former chapter, I cannot doubt their close kindred and dependence on the same causes. In conformity with this view there is reason to believe that the kidneys are the excretory organs most concerned in giving relief in these cases, and principally by an increased separation of the lithic acid or its compounds. Such action may readily escape notice, where the attention is directed by the presence of pain to another part; but I infer it from close observation of many intermittent headaches, and think the remark likely to be confirmed by others."—"On Morbid Actions of an Intermittent Kind," in *Medical Notes and Reflections*, by Sir H. Holland, Bart., M.D., F.R.S., 1855, p. 288.

gestive; it was not anæmic; it was not dyspeptic. It could not be traced to cerebral disease; it was not of neuralgic or rheumatic character; it was not periostitic; it was not periodic. As the urinary secretion from time to time presented alternately oxalates and lithates in great excess, and the hands of the patient's father presented 'the little knobs of Heberden,' some light at length arose to reveal the true character of the perplexing headache. The paternal grandfather was the victim of gout, and died of heart disease. Under the persistent employment of a combination of colchicum with the nitrate and carbonate of potash, aided by those regulations of diet and exercise which are suitable to the gouty habit, the severe headaches were relieved and ultimately removed."

There is another form of headache occurring to persons subject to irregular gout, and who are sallow and cachectic in appearance. This form is far more important than the varieties we have been considering, because it dénotes a more serious affection of the brain or membranes by the gouty poison, due to the latter not finding its proper vent through the joints and cutaneous surface. Some years ago I attended a gentleman who suffered from this form of headache. He was nearly sixty years of age when he first came under treatment, and remained under my observation for upwards of twelve years. The character of the urine and evacuations from the bowels indicated great disorder in the functions of digestion and assimilation; and, although there were pains and obscure swellings in the knuckles, wrist, and feet, no regular attack of gout ever showed itself. The symptoms were

due to the retention of the gouty poison. The patient was liable to be seized with giddiness in walking, and could only be saved from falling by being supported. He experienced at the same time noises in the ears, and a sensation as of something giving way in the head. His complexion was sallow, his sight dim, his face bedewed with perspiration, and his pulse weak and slow. His tongue was generally clean, or only very slightly furred; while the motions were always either clay-colored or dark and bilious, and the urine threw down a thick reddish sediment. It was noticeable that the headache was often relieved when the urinary secretion became thus changed. An active mercurial medicine would gonerally, I found, relieve the headache after the secretions were rectified; but occasionally the symptoms would continue for days, accompanied with extreme flatulence, disordered digestion, and irritability of temper. On some occasions there were fearful attacks of painful colic; but when these were present the head was free from discomfort.

When effete products accumulate in the blood, the vasomotor centre becomes damaged, and the minute arterioles are thrown into a state of spasmodic contraction. This is proved by the increased tension in the pulse, and the reduplicate and accentuated sounds of the heart, as in the case of albuminuria. In the confirmed gouty headache of advancing years the cerebral arteries are atheromatous and thickened, and the calibre being diminished, the blood-supply to the brain is insufficient to nourish it. The emotional conditions to which this important change gives rise are shown in outbursts of passion, and fits of

melancholy depression. "Irascibility is the characteristic *par excellence* of a brain fed with blood laden with gout-poison, and hastiness is habitual; but as the condition of heart-failure becomes slowly developed and superimposed upon the gouty condition, the characteristics of cerebral anæmia are blended with those of lithiasis."*

For this variety of gouty headache, absolute repose, light diet, and careful attention to the liver and bowels, are of paramount importance. If the kidneys are structurally unsound, the patient is in constant danger of his life from the accumulation of the gouty poison; but if they act well, relief may be obtained. This headache, in fact, is due to gout pent up in the system, and, damaging the nervous centres, instead of seeking elimination through the joints in the form of articular inflammation. The treatment, therefore, is much the same as for gout, modified according to the peculiarities and exigencies of each particular case. The gouty diathesis may affect in turn all the internal organs, as is shown by the character of the intestinal disorder, the palpitation, the syncope, the dyspnœa, the vomiting, and headache. And this is liable to occur periodically with those persons whose constitution is not vigorous enough to throw off the poison through the joints. It is, in fact, an internal fit of gout, and the treatment must be conducted on general principles; always bearing in mind the liability of the brain to be depressed by the incautious use of sedatives, and particularly of colchicum. When the urine is loaded, and the evacuations dark or clay-colored, mer-

* On Cerebral Anæmia, by Dr. J. Milner Fothergill, West Riding Lunatic Asylum Medical Reports, vol. iv, p. 104.

curials, podophyllum, alkalies, and salts of lithia may be needed (Form. 79–80–81–31–33–94). Carbonate of ammonia will relieve the head, and minute doses of colchicum may be tried with it to act as an alterative on the blood (Form. 16–32). Of course the same precautions are necessary as in gout, viz., abstinence in eating and drinking, and taking regular exercise.

CHAPTER XI.

RHEUMATIC HEADACHE.

Its Seat—Causes—Symptoms—Importance of Diet and Attention to the Digestive Functions—Iodide of Potassium—Bark—Colchicum—Baths and Waters.

This is occasionally met with in rheumatic subjects. It affects the aponeurosis of the scalp, and the occipito-frontalis and temporal muscles. It comes on from exposure to cold in railway travelling, from the head being uncovered (especially when heated or perspiring), or by sudden changes in the temperature, when north or east winds prevail. But even then it is probable that there has been some predisposing derangement of the general health, or some stomach or liver disorder. The pain is marked by an aching and a tenderness of the scalp and jaws, severe, heavy and continuous; there is an aching too of the teeth and gums (which are often exquisitely tender), and mastication becomes painful. There is no throbbing of the temporal arteries, nor elevation in the temperature of the scalp, but the face is sometimes flushed, the eyes are injected, and the vessels of the head and face are loaded and excited, so that if the patient is of full habit he gets a somewhat bloated appearance. The pain increases in the evening, and grows less towards morning. Dr. Sieveking points out that, according to Romberg, the

pain is of paroxysmal and hemicranial character, especially affecting the forehead and vertex, from which it radiates in various directions, a description which does not completely accord with the majority of cases which have come under my own observation. "I do not," he continues, "find that authors allude to the possibility of an intracranial rheumatic affection; but I have repeatedly met with cases of cephalalgia in which no such external indications presented themselves, and in which the concomitant symptoms, though but feebly marked, the history of the case, and the anti-rheumatic treatment adopted, appear to justify the conclusion that the dura mater, the fibrous envelope of the brain, was the seat of the disease."* This remark quite coincides with my view of the affection, for the dura mater might with as much show of reasoning be expected to sympathize in rheumatic headache, as that the fibro-serous pericardium should sometimes be involved in acute articular rheumatism.

Treatment.—For the treatment of this headache attention to diet is of primary importance, in order to counteract the rheumatic tendency. Vegetables, milk, and tapioca are preferable to animal food, and a little dry wine to beer and spirits. Any derangement in the digestive organs must be overcome by suitable remedies, in order to restore the functions of the bowels, skin, and kidneys (Form. 3–19); and where the local disorder has followed a general attack or is complicated with neuralgia, then iodide of potassium, bark, the alkaline carbonates, and small doses of colchicum will be serviceable

* On Chronic and Periodical Headache, by E. H. Sieveking, M.D., F.R.C.P., in Medical Times and Gazette, 1854, p. 209.

(Form. 36–34–35). "I think it almost certain that some kinds of headache are produced by the same morbid cause in the circulation, which brings on, in other persons, or at other times, true gouty affections of the joints. With due attention to the family temperament, to the individual habit, and particularly to their connection with certain states of the urine, it is for the most part easy to discriminate them; and where thus attested, colchicum will generally be found to act as a safe and efficient remedy."* A sudorific at bedtime, and a liniment to the temples or nape of the neck (Form. 73), will often relieve the wearing pain; and I know of one gentleman who obtains most relief from wrapping up his head in flannel. Warm clothing is very essential; and if the case is obstinate, and the patient has the means to procure change, he may with advantage go to Vichy, Ems, or Homburg, and take the baths and waters there.

* On Gout as a Constitutional Disease, in Medical Notes and Reflections, by Sir H. Holland, Bart., M.D., F.R.S., 3d edition, 1855, p. 267.

CHAPTER XII.

HEADACHE FROM AFFECTION OF THE PERIOSTEUM.

Headache attacking the Periosteum—Its Symptoms and Treatment—Large Doses of Iodide of Potassium—Bark—Bichloride of Mercury—Small Doses of Calomel—Quinine—Arsenic.

This is met with in the subjects of secondary syphilis. It is limited to spots on the scalp, which are tender on pressure; they occasionally present some swelling, as is seen on the skin and sternum when these parts are affected with nodes. The pain is always aggravated at night. The outer surface of the dura mater and the bone are often involved in syphilitic inflammation, leading to adhesion of the brain to the affected spot, and even suppurative phlebitis. A pink or red swelling from congestion takes place, with a caseous patch in the centre.* "Meyer relates eight cases of intracranial disease, in which there were found either fibrinous (gummatous) tumors in the brain, or the results of internal periostitis or inflammation of the membranes, besides more or less marked indications of syphilis in the liver, inguinal glands, or other parts."†

Dr. Symonds alludes, in his remarks on the headache

* Pathological Anatomy, by Wilks and Moxon, 2d edition, 1875 p. 198.

† New Sydenham Society, article, Nervous System, 1862, p. 79.

of secondary syphilis, to the experience of Mr. Spencer Wells, who has noticed a very striking symptom, pain across the forehead where the brim of the hat presses. The pain is due to subacute frontal periostitis; and, if the case is bad, and the system saturated with the syphilitic poison, the specific inflammation may extend to the membranes, and involve the brain itself.

One of the most marked instances of this type of headache came under my notice nearly twenty years ago. The subject of it was a young officer twenty-five years of age, in whom the syphilitic cachexia was strongly marked. The pains in the head (chiefly frontal) were the latest manifestations of the syphilitic poison, and were the chief cause of his quitting the service. The natural placidity and cheerfulness of his disposition were exchanged for irritability of temper and fits of passion. The attempt to alter his position in bed, or to give food at the wrong moment, threw him into an uncontrollable fury. To this succeeded great exhaustion, a feeble pulse, and a clammy skin; and sometimes nausea and vomiting were also present. For some days he would continue in a state of heavy stupor, from which it was as difficult to rouse him as to rouse a drunken man. He would turn his face from the light, knit his brows, and conceal his head beneath the bedclothes.

Iodide of potassium in large doses, with tonic bitters and bark, were ordered, together with small doses of the bichloride of mercury, from which he derived partial benefit (Form. 37). But eventually the condition grew worse, the cachexia increased, and the brain fell into a state of syphilitic degeneration, producing hemiplegia, from which he partially recovered for a few months.

Gradually the worst symptoms returned; he became more and more exhausted, probably from obstruction in the cerebral vessels, or lesion in one or more of the membranes, and died at the end of a year after the head was first affected. Until the paralytic symptoms came on the external surface of the head was always tender, and at times exceedingly painful. No fluctuation or signs of matter were found beneath the periosteum, which I have known to be the case among soldiers who have had syphilis in a bad form.

The treatment is the same as was employed in this case, iodide of potassium being the chief medicinal agent. It should be given in full and continuous doses, and not abandoned till forty or sixty grains have been taken during the day, freely diluted with water, and after the principal meals. If it is hastily given up the case may end fatally, when large and repeated doses may cure. "The average dose of iodide of potassium is from twenty to thirty grains three times a day, which is reached by rapid steps, from six to eight grains given at first. The larger doses are necessary. I have repeatedly seen relapses, when the dose has been at ten or twelve grains, checked and cured by a rise to twenty-four or thirty-six grains. I have given a drachm every four hours for a short time, and one patient came to me who had for two or three months taken this quantity three times a day with advantage, under the direction of his family medical attendant, who had 'bettered' my advice after a previous consultation with me. On the other hand, I have met with cases in which a single grain of iodide of potassium produced great depression and other injurious effects; in these one-quarter or half a grain may do all the good, or

iodide of sodium or of ammonium may be tolerated."* It occasionally happens that small doses of calomel (gr. $\frac{1}{10}$) every two or three hours relieve the pain, and prepare the way for the iodide.

Another remarkable case of syphilitic headache in a young man fell under my notice some years ago. The patient, who was strong and healthy at the time when he contracted syphilis, took an abundance of mercury, which greatly reduced him, and encouraged the ulcerative process. Severe secondary symptoms ensued, with nodes on the cranium and tibiæ, which produced foul suppurating sores, and caries of the affected bones. Alarming epileptic seizures followed, accompanied by great irritation of the brain and membranes, and his life was often despaired of. When a sore on the leg or foot discharged freely, it favored the escape of the syphilitic poison, and considerably modified the cerebral symptoms. The treatment consisted in strict attention to hygienic rules, the fresh, pure air of the country, and a generous diet. The remedies prescribed in the shape of drugs were iodide of potassium, quinine, and arsenic (Form. 38). Under their separate and combined use, and that great power which nature, if allowed time, possesses to remove morbid products, when the internal organs have escaped structural mischief, the patient perfectly recovered, and is now in as good a state of health as any person of his age could expect to be.

In cachectic conditions mercury may be given with advantage, and without detriment to the patient, if combined with iron (Form. 4).

* On Syphilitic Affections of the Brain, by W. H. Broadbent, M.D., in The Lancet, Nov. 25th, 1876.

CHAPTER XIII.

ORGANIC HEADACHE.

Character of the Pain in Organic Headache, Continuous, Limited, or Paroxysmal—The General Symptoms assist in the Diagnosis of the Cerebral Changes—Often due to Atheromatous Degeneration in the Cerebral Vessels—Terminations in Apoplexy and Paralysis—Usual Causes of Organic Headache—Cysts—Hydatids—Exostoses—Syphilis—Value of Large Doses of Iodide of Potassium in all Cases of Cerebral Tumor, whether due to Syphilis or not—Rest to be procured by Bromide of Potassium and Hydrate of Chloral—If all Hypnotics fail, the Hypodermic Injection of Morphia to be employed.

Organic headache (*Cephalalgia organica*) is called "Structural Headache" by Dr. Symonds, but I prefer the term organic, because it is more clearly expressive of the grave morbid changes which provoke it, such as tuberculous, cancerous, or syphilitic tumors, hydatids, ossific formations within the cranium, softening of the brain, adhesion of the membranes, arterial degeneration, aneurism, obstruction of the sinuses, and so forth. But disease of the brain from any of these causes may be present without our being able to recognize its nature or its extent, as in the case of the late Professor J. Hughes Bennett. A tumor may exist and cause neither headache nor any cerebral disturbance, if the membranes are not stretched, and inflammation does not ensue. When either of these results follows, then symptoms, which till then

have been obscure and perplexing, are occasionally cleared up. The brain accommodates itself to pressure when it is gradual and brought about slowly, and thus the encroachment is not resented, owing to a new adjustment of the circulation, and balance of the various structures within the cranium. Before pain is complained of, there is sometimes impairment of function, as in the case of a small tumor, or softening at the origin of the third nerve, by no means an uncommon accompaniment of organic headache; and we derive important and conclusive evidence of the situation of the lesion, when the patient does not complain of the sensation of headache, and is able to follow his usual duties. Yet on the other hand, a tumor has been found to occupy the centre of one of the hemispheres of the brain, or ventricles, and to cause no disorder of motion or special sensation, no failing sight, no impairment of intellect, no threatening palsy. Pain in the head has been the one single and constant symptom, sometimes even intermitting, and coming on in paroxysms. This depends on some varied condition of the circulation. Paroxysmal pain is often observed in structural disease of the brain, from the liability of all nervous pain to take on this peculiar feature; but if pain is intense and continuous, and is referred to one particular spot, some organic lesion may be suspected. The headache which never yields for a moment to any treatment may be safely put down as organic. The pain of organic headache is an abiding and continuous agony; it enters into every thought, and the patient lies in some obscure corner of the house, or in bed, silently enduring the maddening pain, with the saddest and most pitiable expression. He can do nothing, and think of nothing;

it is impossible to distract his attention in such a way as to convince one that he is ever entirely free from pain. "Dr. Hughlings Jackson remarks that frontal headache is generally referable to abdominal affections, vertical headache to cerebral disturbance, and occipital pains to disorders of the circulation, and more especially to anæmia. However that may be, it is certain that the pain due to cerebral disease may, especially in the case of cerebral tumors, be referred to all parts of the head, and that this pain may exactly simulate those which are of no less serious origin. It may be slight or intense, continuous or paroxysmal; may be attended with tenderness of the scalp, or with several of the symptoms which have been already referred to as frequent accompaniments of headache. When the pain is intense, and especially if it be paroxysmal, it frequently causes the patient to scream out, and to support his head with his hands. The most intense pain, which is then usually very limited as to its seat, is induced by the pressure of intracranial tumors or abscesses upon sensory nerves."* Dr. Walshe's experience concerning the diagnosis of a cerebral tumor is much to the same effect. He says, "The circumstances most distinctly permitting the physician to affirm that a tumor exists within the cranium are: the existence for a considerable period of intense cephalalgia, especially if limited to a fixed point, or even to one side of the head, and if attended with repeated vomiting; of convulsive movements without paralysis, but followed by mere weakness, or actual paralysis of the affected parts; of different affections of the organs of sense, especially alteration of

* The Theory and Practice of Medicine, by Dr. Bristowe, 1876, p. 942.

sight, and of disturbance of intellect, while the general health does not very materially suffer."*

It is obvious that the pain, as a rule, varies according to the size and seat of the tumor, and the pressure to which the several nerves are subjected; but when it is remembered that a tumor may attain considerable magnitude before it causes pain or inflammation, the subject of diagnosis is confessedly obscure. Dr. Abererombie relates a class of cases, which are often mistaken for periodical or sick headache, the pain not being urgent enough to invite attention to the head as the origin of the mischief, but to the stomach as the supposed offender. After death the chief morbid appearances are found in the cerebellum. There are cases, too, in which giddiness, failing muscular power, loss of sight and recollection, are the chief features; but there is no headache whatever, and exemption from it may be possibly owing to degenerative changes in the nervous tissue, rather than to pressure on membranous structures, and congestion of the cerebral vessels.

Organic headache, then, is distinguished by the continuance of the suffering, which either extends over the entire brain, or is deeply seated in one spot. It occasionally resembles the congestive form of headache from overdistension of vessels, which is so frequently present; though some cases exhibit pallor and anæmia, with much pain. Some years ago a man, aged forty, came under my care, who suffered the most excruciating agony in the vertex and left side of the head, from which he never had a moment's respite, and his agony was so acute that he

* The Nature and Treatment of Cancer, by W. H. Walshe, M.D., 1846, p. 495.

longed for death. Though there was at no time of his early illness any symptom of paralysis, or loss of memory or sensation, it was conjectured that he was suffering from disease of the brain, because the pain was continuous and fixed, and his expression vacant and desponding. His forehead was wrinkled, his brows drooping, and his eyes had lost all animation. In the course of a few weeks, whilst under observation, delirium came on, accompanied by vomiting, and inability to retain any food on his stomach. These symptoms continued, and he fell into a comatose condition and died. After death a cancerous tumor was found in the left hemisphere, extending posteriorly and downwards to the margin of the left lateral ventricle, but not to the deeper structures at the base of the brain.

The presence of febrile symptoms, with rigors and high temperature, where there is pain in the head, would help us to the diagnosis of the organic change within the cranium, as in tubercular mischief, or the formation of an abscess. When headache in a young adult man comes on with symptoms approaching convulsion, or epileptic seizure, and there is any amount of facial paralysis or thickening of speech, it is suggestive of organic origin, and more especially so if there is a history of syphilis. If vomiting be added to the list of symptoms, it is all the more likely, particularly if no relief follows, which generally does follow if the headache be due to gastric disorder. It comes on suddenly, and the patient may be able and willing to take food immediately after the contents of the stomach have been expelled.

This headache is witnessed in softening of the brain, where the bloodvessels are diseased from atheromatous deposit. In a female patient, aged seventy, who was

under my care in 1875 for this headache (which she described as unceasing and occupying the whole frontal region), there were present most of the symptoms which accompany disease of the brain, such as depression of spirits, the apprehension of some impending calamity, and the gradual failure of the intellectual powers. No treatment was available in removing the headache, and it is probable the termination is not far distant in a paralytic or apoplectic seizure. In this case, as in many similar cases, there was more confusion of ideas than pain.

In 1867 a gentleman, aged seventy-four, consulted me for frontal headache, which was so overpowering, that in my presence he often wished for deliverance by death. He had had two slight apoplectic seizures in 1866, due to cerebral hæmorrhage. There was atheromatous change in this case, and the radial and temporal arteries gave indications of hardness and tortuosity; depression of spirits and irritability of mind and manner were also noticeable features of his changed condition. After dinner the headache was generally relieved by a larger quantity of wine than was allowable, and next morning the pain and confusion of ideas were increased. In this case much relief was obtained by carbonate of ammonia and calumba (Form. 54), and by valerianate of zinc and hop in the form of a pill (Form. 105), and ammonia and tincture of lavender (Form. 55). A few months before his death, in August, 1868, from sudden apoplexy and hemiplegia, he had quite lost his headache, and the condition of the brain did not appear worse until the time of his fatal illness.

Among the causes of organic headache, a blow on the head, received at an early period of life, may eventually provoke a change in the vessels which leads on to organic

disease. A slow insidious congestion or inflammation may end in mischief by causing a local pressure, impeding the circulation in some parts, and increasing it in others. Dr. Moxon says: "The organic causes of great headache are never diseases of the proper nervous tissue, but always diseases of its enveloping textures."* Here it is right to state that this view is open to some question. "It may be well briefly to advert to the ratio in which cephalalgia occurs in organic affections of the intracranial contents, determined by cadaveric inspection. We shall find that it is a symptom of less frequent occurrence than we might have anticipated, a fact which negatively demonstrates the necessity of additional care in attending to other signs indicating disturbance of the nerve-centres. The analysis of authentic cases of this description also shows that there is no definite relation, except in the instance of the cerebellum, between the site of the lesion and the site of the previous pain." Taking the diseases of the cerebrum and cerebellum together (apoplectic and non-apoplectic cases), furnished by Andral and Dr. Abercrombie, "we find that the ratio in which headache is a concomitant of organic disease of the brain is as 92 to 38, or nearly as 3 to 1; while by eliminating the apoplectic cases, we obtain the still higher ratio of 74 to 15, or nearly 5 to 1."† "In twenty cases of fungus of the dura mater, published by Louis (*Mém. de l'Acad. Roy. de Chir.*, t. 5), there were only three with cerebral symptoms of any kind; and chronic abscesses, cysts, hydatids, exostoses, etc., have

* Dr. Moxon, On the Treatment of Headache from Intracranial Disease, in Lancet, May 29th, 1875, p. 750.

† On Chronic and Periodical Headache, by E. H. Sieveking, M.D., F.R.C.P., in Medical Times and Gazette, 1854, p. 181.

often arrived at an enormous size without having produced any serious alteration in the functions of the brain."*

Treatment.—Here our first steps are to ascertain what is the cause of the headache, and in what way we ought to proceed to arrest the inflammation or the pain which has been set up. Dr. Moxon considers that organic headache occurring in the earlier decades of adult age demands large doses of iodide of potassium, and that it even yields to this drug when not of a syphilitic nature. It must be evident, as he says, to most observers, that syphilis may affect the system without our being able to trace any hereditary history of it, or to find any evidence of it on the skin or bones of the body. When the iodide does afford relief to the suffering, I am strongly inclined to think there is some undiscovered syphilitic taint, for I have seen many cases of confirmed headache, supposed to be due to organic change, both in young and old persons, who have derived no advantage from the drug; on the contrary, the pain has increased under its use. In one case of syphilitic headache, the iodide, which gave relief at first, failed altogether in the latter period of the patient's life; and in another case the drug made the patient much worse at first, but better afterwards. It may be given in small doses, sometimes combined with the bicarbonate of potash and small doses of sal volatile (Form. 56); but as many as forty or sixty grains should be given in the course of the day, if there be a suspicion of syphilis and the pain is continuous. Dr. Smith recommends iodide of potassium in all cases of headache due

* Tweedie's Practical Medicine, article Cephalalgia, 1840, vol. ii, p. 154.

to cerebral tumor. If the growth depends on syphilis, it may cure the condition entirely; and, if not, it has been known to relieve the pain and local congestion induced by other swellings, so that the remedy is worth a trial in all cases that appear obstinate.

Bromide of potassium and hydrate of chloral will be necessary to procure rest if the patient is wakeful and can obtain no sleep; but if these remedies fail, with other suitable hypnotics, then the subcutaneous injection of morphia may be tried, and the observations I have elsewhere made are also applicable here.* Dr. Moxon found that gr. $\frac{1}{5}$ of morphia, used hypodermically, gave relief in a syphilitic case after the iodide failed; but he urges caution, from its liability to produce insensibility; and, apart from the possibility of this contingency, it does induce very serious depression and mental disturbance in some persons, even when the operation is carefully performed and the quantity used very small. When the pain is severe and yields to nothing else, it ought to be tried.

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* See Chapter VII, on Nervous Headache.

CHAPTER XIV.

HEADACHES OF ADVANCED LIFE.

These can scarcely be separated from the headaches of organic disease, there being in all likelihood some change of structure; the vessels become brittle and atheromatous, and the circulation through the brain is impeded and deficient. There are many of the changes that may be looked for in the decline of life, when the physical frame grows feebler and weaker, and the tissues are but slowly renovated. In some persons of full habit, who are advanced in life, the headaches are of a congestive type, and therefore any excitement of the circulation, as overeating, or too great indulgence in stimulants, may cause the vessels to rupture, and so an apoplectic seizure be induced; for, the brain having undergone softening change through the failure of nutrition, the withdrawing of this support renders the vessels exceedingly liable to rupture from any sudden strain which may be put upon them. In cases of headache dependent upon cerebral softening, the suffering is less acute than in most other of the organic varieties, and irritability and fits of depression are more common. Dr. Herbert Major demonstrates that the large nerve-cells are in a state of granular degeneration in senile atrophy of the brain, and that

the smaller cells are simply atrophied without degeneration.* It is highly probable that many of the morbid changes found in senile atrophy of the brain are the cause of the headaches of advanced life, and also those headaches which we ascribe to organic change. We cannot expect that we shall find anything at all constant in character with the various morbid conditions of the brain.

Treatment.—If there is a tendency to congestion about the head, it should be controlled by those remedies which naturally suggest themselves to the practitioner. A mild aperient and cold sponging the head night and morning will be found serviceable (Form. 81). In the case of one patient who had confirmed headache from cerebral degeneration, I found that a large sponge filled with water, and allowed gradually to empty itself over the top of the head night and morning, gave more relief than any other remedy that was tried; it calmed the excitement, promoted sleep, and refreshed the patient, so that he was able to walk a short distance with comparative comfort after it. When cold is thus locally applied, it has a tonic and invigorating effect. By contracting the vessels and lessening the supply of blood to the brain, it retards the cell growth and other degenerative changes in the tissues.

Ergot of rye is a useful remedy, and has been given with benefit in these cases. It causes contraction of the vessels through its influence on the sympathetic system, and our experience of its efficacy in the treatment of uterine hæmorrhage and hæmoptysis entitles it to a most prominent position among styptic agents. Twenty to

* Observations on the Histology of the Morbid Brain, in West Riding Lunatic Asylum Reports, 1874, vol. iv, p. 223.

thirty minims of the liq. extract ergot, in water, with a few drops of spirit of chloroform, three times a day, is a fair dose (Form. 57), but Dr. Smith* recommends much larger doses. He begins with one drachm of the same preparation, and increases it to half an ounce three times a day (Form. 58). If the theory is correct regarding the action of ergot, these large doses are not advisable. In small doses it is known to contract the arterioles very considerably, but in large doses it leads to exhaustion and subsequent dilatation. Judging from the headache which it sometimes induces when used in menorrhagia, smaller doses are preferable, and in most cases will be found equally effectual. If these measures fail to afford relief, and the patient is in so much pain that sleep cannot be obtained, opium alone, or the bromide and chloral mixture must be resorted to, and in doses full enough, and as often repeated as the urgency of the case appears to warrant.

The treatment also comprises fresh air, light food, and cheerful conversation; for there is a risk in confirmed cases of the mind becoming so weak, that the patient may end his days in a lunatic asylum.

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* Therapeutics of Headache, by A. A. Smith, M.D., a lecture delivered at Bellevue Hospital Medical College, in Medical Record, September 15th, 1876.

The action of ergot is further alluded to in Chapter II, on the Headache of Cerebral Hyperæmia.

CHAPTER XV.

NEURALGIC HEADACHE.

Relation to Nervous Headache—Its Origin traceable to Decayed Teeth and other Local Causes of Irritation, as Changes of Weather and Uterine and Intestinal Disturbance—Its Origin in the Special Poison of Ague—Pain precedes Sickness, and is not relieved by Vomiting, as in the Dyspeptic or Bilious Headache—Acute Hearing a premonitory Symptom—Hard Work a common Cause—Cases in Illustration—Renal Cirrhosis a cause of Hemicrania.

Treatment—Nutritious Diet—Local and General Stimulants—Bitter Ale—Brandy and Water—Rest and Full Doses of Quinine—Carbonate and Hydrochlorate of Ammonia—Veratria and Aconitina Ointments—Hypodermic Injection of Morphia—Valerianate of Zinc—Phosphorus—Strychnia—Cannabis Indica—Arsenic—Iron—Cod-liver Oil.

This is really one form of nervous headache. It affects one side of the head and face (hemicrania), or it fixes on one particular spot, causing a sensation as though a nail were being driven through the head (clavus hystericus).* It frequently proceeds from decayed teeth, or

* With regard to these definite and tender spots having their origin in the fifth nerve, Dr. Anstie thus writes: "Ever since the time of Valleix, most authors have disposed of this question summarily, by inquiring as to the existence or non-existence of certain *tender points* at particular situations in the course of various branches of the fifth nerve. Supposing it were possible that a patient should be affected with universal and equally violent neuralgia of all the princi-

some other local cause of irritation, which may depress the nervous system and weaken the appetite and digestive functions.* It is one form of neuralgia like tic doulou-

pal branches of the nerve, the situations in which the most important of these painful points would be developed are such as you see marked on the diagram: 1. The parietal point. 2. The supraorbital. 3. The trochlear. 4. The palpebral. 5. The ocular. 6. The nasal. 7. The infraorbital. 8. The malar. 9. The superior labial. 10. The mental. 11. The auriculo-temporal. Pressure on any of these points, even in the intervals of the neuralgic attacks, causes an exquisitely acute pain to dart along to the terminal branches which lie external (peripheral) to the tender spot."—"Lettsomian Lectures on Certain Painful Affections of the Fifth Nerve," by F. E. Anstie, M.D., in *The Lancet*, August, 25th, 1866, p. 200.

* "A gentleman had for many years been liable to attacks of headache on the slightest provocation. Long-continued intellectual exertion, the excitement of an agreeable party, a journey, any error of diet, would inevitably lead to an attack of headache. During the same period he suffered at different times from pain in his teeth, which decayed rapidly, and at last were removed and replaced by false ones. This change happened more than a year ago, and since that time he has been almost exempt from pain in the head. In other respects his health and mode of life have been unaltered. What was the connection between the diseased teeth and the headache? The morbid impressions on the ganglionic fibres of the fifth pair might, without any stretch of hypothesis, be reasonably presumed to induce a morbid state of the Gasserian ganglion, whether the impressions on the sensory fibres did or did not reach the sensorium, and induce a painful sensation referred to the teeth. The Gasserian ganglion is connected by marked fibres with the cephalic ganglion, from which a large number of nerves pass to the cerebral arteries. The cephalic ganglion probably partook of the morbid condition of the Gasserian, and hence might have arisen so susceptible a state of the ganglionic nerves of the brain that they may have become disposed to ache under the influence of impressions which, without the predisposition in the nerves, produced in the manner I have described, would have no effect. It seems to me that if this explanation cannot be accepted, there is no alternative but the supposition that morbid im-

reux, and the paroxysm may come on after regular and short intervals of ease, or after irregular and long intervals. I have often met with it in women out-patients who come periodically to get relief after hard work or poor living; and this they find in full doses of quinine, and in rest. Any causes that induce excitement or exhaustion, as severe leucorrhœa, or other uterine loss, will bring it on in subjects who are predisposed to it. Women drained from menorrhagia are as common victims to this variety as they are to any form of nervous headache. I could enumerate many examples of acute suffering from this cause, in which the periods of intermission were very short, and the local mischief that followed was obstinate and troublesome; impaired motion of the affected eyelid, conjunctivitis, and excessive secretion from the lachrymal gland may all be looked for in severe cases. Sometimes the disease is distinctly intermittent, like an attack of ague, and it is commonly traceable to the same exciting causes. From my own experience I should say that neuralgia of malarial origin is very rare, at least in London practice. The improved dwellings of the poor through-

pressions on the dental nerves (not creating pain in those parts), arriving at the central extremities of the nerves, are passed on to that part of the sensorium which is related with the sensory fibres of the ganglionic nerves of the brain, and maintain in that part of the sensorium a morbidly susceptible condition; and that this condition is brought into such action as constitutes pain, whenever the said part of the sensorium receives impressions transmitted from nerves which have been offended by causes acting directly upon them in the brain itself, as in overstudy or anxiety, or when it has received like disturbing impressions from the nerves of other parts of the ganglionic system."—Symonds, on Headache, in *Medical Times and Gazette*, April 3d, 1858, p. 339.

out the country, and the better drainage of the soil, which has rendered the ground more productive and easier of cultivation,—two powerful means of improving the physical and elevating the moral nature of man,—have reduced this cause very considerably. With these changes in human progress, the spread of malaria and fevers of all kinds have greatly diminished. When neuralgia is present from this cause, it affects the fifth nerve, or some of its branches, and the periodicity may be as regular as a quotidian or tertian ague. The true neuralgic headache seldom extends over the whole head, or produces sickness or vomiting, unless the attack has lasted long and is very severe. I should limit its strict definition to the intensity of the suffering, and its superficial seat; to the paroxysmal character of the pain, and its extension in the course of the superior branch of the fifth nerve, and those filaments which supply the orbit, inner angle of the eye, and forehead. I would here say, however, that the pain in some cases appears to enter the eye or the brow, to pierce through the centre of the head and to escape at the occiput, or to find its way out through the neck, arms, and legs. The pain in the limbs resembles a pricking or numbness, and the patient suddenly finds, whilst engaged in writing, that he cannot hold or control his pen, and he then becomes apprehensive of paralysis. I have met with several instances of the kind. Phosphates are frequently present in the urine.

In this headache, as in the nervous variety, the pain precedes the sickness, and is not relieved by vomiting. The patient vomits incessantly, till almost torn in two by the violence of the retching, and only brings up some frothy watery mucus—not a vestige of bile; but in the

vomiting of dyspeptic headache, or from indulgence in alcoholic drinks, the nausea and vomiting precede the headache, and afford relief from the removal of the cause.

Extreme sensibility to sound of any kind, or a distressing acuteness of hearing, is an occasional accompaniment of neuralgic headache. I am acquainted with the case of a married lady who has long been in delicate health from spinal weakness, and whose decayed teeth have partly induced the attacks of neuralgia in the head. When she is suffering from hemicrania she can hear the ticking of a clock in an adjoining room, in which she cannot even hear it strike when she is free from headache. The ticking of her own watch, and that of any other person in the same apartmant, is quite annoying, if not almost unendurable to her. Another peculiar feature of the case is, that the patient knows when an attack of headache is threatening by her hearing becoming suddenly acute, and when the attack is likely to pass off, by a decline in its sensibility.

Excitement of all kinds will bring this headache on, as the noise of railway travelling, and any bustle or confusion; but it is more frequently attributable to disordered digestion, and to changes in the weather, than to causes operating on the brain itself. It is most frequent in adult or middle life, and is far less common in children;* but if it happens to those advanced in years, when degenerative changes are established, it is often severe, protracted, and obstinate. It may be noticed that other neuralgias are equally common at this period of life, as sciatica, pleurodynia, angina pectoris, and gas-

* See Chapter XVI, on Neuralgic Headache in Children.

tralgia. I consider oversuckling a most fertile cause in women, and among hospital patients it is common enough, when they have to contend with the cares and privations of a miserable home, and the common necessaries of life are not to be obtained. Hunger and fatigue are followed by sleeplessness, and the various causes of nerve starvation invite the malady, or set light to a pre-existing local distress.

A northeast wind, or a cold harsh day, will frequently invite an attack of neuralgic headache in those persons who are subject to it.

With regard to decayed teeth as a cause of neuralgia, it is important that they be not hastily removed. Many young persons have had tooth after tooth extracted, and still the pain has continued. I remember a nervous and delicate young lady, twenty years of age, who, having lost three teeth at the hands of a dentist, and finding the neuralgia of the head and face as bad as ever, gave up the idea of ever submitting again to a similar operation. She took quinine, arsenic, and cod-liver oil, and the pain gradually left her, notwithstanding she had many stumps and carious teeth. For months together she was free from all pain; but it returned from time to time when the health was lowered, and again yielded to the same measures. "There are plenty of facts which suggest that lesions of nerves not necessarily painful may become so from causes originally by no means local. Thus, I believe that there are hundreds of people walking about London this minute, the diseased nerves of whose carious teeth would be speedily roused into severe neuralgia by two or three nights of sleepless watching and anxiety, or by two or three days of insufficient nourishment or of

violent and exhausting exertion of mind or body. And, conversely, I am sure that a generous diet will often relieve the agony arising from sheer involvement of nerves in a cancerous deposit."*

When a person who has a solitary decayed tooth is suffering from continuous neuralgia of recent duration, and the general health is not reduced, I should advise its extraction, if constitutional remedies have failed. In most cases this will be found a good rule to carry out; but if there are several decayed teeth, and the patient is weak and delicate, then I should prescribe rest, good diet, and nervine tonics, and trust to the dentist's powers of arresting further decay. Women who stand for hours together over a washtub, or a laundress's table, are frequent victims to this form of headache. Household servants who work hard and are overanxious to discharge their duties creditably, are sometimes great sufferers. In confirmed cases, if the general health is much impaired, the hours of labor must be diminished, or there will be no prospect of recovery; indeed, in many instances the situation has to be given up, and pure air and complete rest obtained. The following is a case in illustration:

M. A. S., æt. 33, s., a female servant, and a resident in London, consulted me May 22d, 1877. She has been subject to sick headache all her life, but has become much worse during the last nine months, which she attributes to hard work and fatigue; extra work increases the pain, and going upstairs tires her exceedingly. The

* Dr. Brinton, on Anomalous Intussusception of the Intestines, in Lancet, April 11, 1863, p. 411. Quoted from Dr. Handfield Jones, On Functional Nervous Disorders, 1870, p. 499.

house in which she resides has been much altered in its arrangements, and this vexes and worries her.

History and Present Condition.—The patient is thin and weak, and bears all the evidences of a nervous temperament. Never had any illness except indigestion two years ago, which lasted six weeks. Catamenia regular, but scanty; slight leucorrhœa; bowels regular; appetite capricious, sometimes ravenous; has slept badly of late. Her mother suffered periodically from headache.

The patient's early headaches were always relieved by sleep, and if she could get a nap she was certain to be better, or if she went to bed a good night's rest would set her up. Now she cannot trust herself to go out anywhere, and she is afraid of returning with the pain. She feels very low-spirited with it, but not hysterical, and is inclined to shut herself up, and keep quiet.

Character of Headache.—The situation of the pain is entirely unilateral; it begins over the right eye, above the brow, as a heavy pressure, which works through the centre of the right half of the brain to the occiput (one-half of head), the neck becomes stiff, and there is difficulty in rotating the head; then the pain extends down the right arm, and the fingers of the same side feel stiff and the right leg is weak, as if asleep. She is very flushed when the pain is on her, and the right eye is red, injected, and watery, and the lower eyelid is rather puffed and quivering. Sometimes she feels irritable before the pain comes on, and nothing goes right. The impulse of the heart against the sternum is weak, sudden, and short, and the first sound is rather blowing, as in anæmic states of the blood; the least excitement causes palpitation and discomfort over the præcordial region, while she experiences

feelings of breathlessness and anxiety; the pulse is weak and tremulous, and the hands and feet are inclined to be cold.

She was ordered cocoa instead of tea, and to take as much milk as she could digest. White fish, fowl, and mutton were to be the chief forms of food; pastry and stimulants were rigorously forbidden. In the shape of medicine, pil. aloes et assafœtid., gr. x, in pil. ij, at bed-time, were prescribed occasionally. Bromide of potassium and ammonia when the attacks of headache threatened (Form. 26), and a mixture of iron and arsenic twice a day (Form. 24 *b*).

May 29th. On the two days following her visit she had severe headache, but the last three days she has been easier, and has slept better; the right eyelid is puffed to-day, and there is pain over the orbit, from the corner of the nose to the temple of the same side. She has some difficulty in walking up and down stairs; both the right leg and right hand are cold, stiff, painful, and rather swelled, but she is on the whole better, though nervous about her state.

August 2d. The queer sensation in her right hand and leg has departed for three weeks, and she has had no headache whatever for five weeks. She can take a long walk without any fatigue, and she looks quite well. She has taken the arsenic and iron mixture twice a day since it was prescribed, and a pill occasionally. The right eye is still puffed, and pain will always bring on this œdematous condition.

In September the patient had gained flesh and strength, and there was no return of the headache. She was in all respects well, and the recovery was due to her better nutrition, and improved quality of blood.

Neuralgia points to a lowered state of vitality in the track of a nerve, and to combat this nutrition must be improved. Dr. Anstie thus gives his own personal experience:

"I have been subject, ever since childhood, to severe attacks of neuralgia of the brow, entirely independent of digestive derangement; although liable, as this affection usually is, to be aggravated by any coincident stomach disorder.* The pain always follows accurately the course of those branches of the fifth nerve which are distributed to the forehead, the internal angle of the eye, and the nose, more rarely extending also to the branches derived from the second division of the fifth nerve, and distributed to the cheek, *but always on the right side only.* This kind of headache began to trouble me at about the age of fourteen, and for two or three years was of frequent occurrence; for many years past, however, it has been an unfrequent visitor. One circumstance ought to be mentioned, although I cannot pretend to estimate its exact relation to the production of the neuralgic pain, viz., that about the time when the headache first occurred with any severity I began to suffer from an obstruction of the lachrymal duct on the same side. This obstruction has been ascertained to depend upon a light stricture of the upper end of the nasal duct, close to the lachrymal sac, and is apparently caused by a tough fibrous cicatrix, probably the relic of some past ulceration. Treatment by the passing of metallic probes has been adopted from time to time, with

* A neuralgic headache is sometimes caused by gastric irritation and acidity, and a full dose of an alkali, as half a teaspoonful of bicarbonate of potash in a wineglassful of water, will liberate carbonic acid in the stomach, and speedily remove the pain.

great temporary relief, but the obstruction has always recurred, and, as a consequence of it, the discharge of tears from the gland is incontinently profuse. The attacks of pain are invariably caused by fatigue of body or mind, and are preceded and accompanied by pallor of the face, weak pulse, and a general sense of depression. The only remedies which are of the slightest value are sal volatile, hot tea, and occasionally quinine in a full dose, or a glass of wine. Ammonia and hot tea are most frequently useful."*

The condition of the renal organs has much to do with headache, and I have seen very persistent forms of it (see page 190, Uræmic Headache), when the kidneys have sustained mischief from scarlet fever and desquamative nephritis. The cases I have generally observed have been marked by continuous frontal headache, heavy and oppressive, less at one time than at another, but rarely if ever completely absent for a single moment. Dr. Barthels has witnessed severe hemicrania in connection with renal cirrhosis, and I shall therefore quote his own words on the subject. "In other cases, the first evidence of the disease consists in frequent and severe *attacks of headache*, sometimes occurring under the form of excessively severe *hemicrania* of remarkably long duration; indeed, I have observed this form a number of times. The pain, too, may extend down the neck, and even to the brachial plexus of the affected side. Such paroxysms may last for several days. In one case of this kind I noticed almost complete anæsthesia of the skin of the face and of the fingers upon the affected side during the continuance of the attack. This patient had an attack of

* On Stimulants and Narcotics, by F. E. Anstie, M.D., 1864, p. 83.

the kind nearly every week; and, finally, during the intermissions, normal sensation did not quite return to the face or fingers, but a feeling of numbness and formication remained.

"In any case of migraine occurring after middle life in an apparently robust individual, it is well to consider the possibility of the nerve affection being dependent upon contracting kidneys. Neuralgic pains in the track of other nerves have, in my own experience, proved far less common than headache, so that I am still doubtful whether I can properly connect these isolated attacks of neuralgia with this renal disease as cause and effect. But the terrible itching of the skin, which I shall advert to hereafter, may be reckoned belongs indisputably among the results of the renal affection, and it is likely enough that a more or less extensive muscular pain that sets in toward the end of life and is usually satisfactorily but fancifully explained under the name of rheumatism, owns a similar origin."*

Treatment.—The subjects of this variety of headache being usually anæmic, the first indications are to improve the general conditions by nutritious diet, and enforcing mental and bodily rest. I have known a full dose of brandy and water give almost immediate relief when the attack was limited to one side of the head and face. A lady who was under my care some years ago was able to ward off a neuralgic headache, which came on late at night, by taking a slice of bread and butter, and a glass of Bass's ale, or good bitter beer, before getting into bed. A local stimulant of chloroform and aconite liniment will

* Cyclopædia of Medicine, by Dr. H. von Ziemssen, Diseases of Kidneys, vol. xv, p. 421.

sometimes give ease after friction for a few minutes. A little extract of belladonna rubbed into the affected temple will be useful in some cases (Form. 110), and an ointment of aconitina (Form. 113) or of veratria (Form. 111) will prove efficacious in some obstinate cases. Internally, the carbonate of ammonia will sometimes be of service (Form. 16). The chloride of ammonium is another good remedy in these cases, particularly if the pain extends to the face (facial neuralgia). It should be given in ℈j or ʒss. doses (Form. 27), and if no relief follow the administration of three or four doses, it is not well to continue it. It diminishes congestion of the vessels, and promotes cutaneous action and diaphoresis.

When the pain is very severe the hypodermic injection of morphia (gr. $\frac{1}{6}$) may be tried, and it is necessary to conduct the operation carefully, as troublesome boils, and even sloughing, may follow; and on this account I should be reluctant to employ it for the face.

The hypophosphite of soda in infusion of calumba (Form. 28) is a good remedy, or the hypophosphoric acid may be given in combination with quinine, strychnia, and iron (Form. 21–22–22 *a*–23).

Arsenic is a remedy of the greatest possible value, if it is given judiciously and watched carefully; but it is too generally abandoned on the first symptoms of constitutional irritation becoming manifest, and when its alterative effects on the blood are about to be secured (Form. 8–9). Under these circumstances it should be discontinued for a time, and then resumed again. It is well to be acquainted with the physiological signs of arsenical action, for the exhibition of small doses in some persons of peculiar idiosyncrasy is accompanied with so much

nausea and depression, as to render the continuance of the remedy unadvisable.

"I have witnessed the postponement and ultimate cessation of a periodic headache through the influence of arsenic before the pricking eyelid or silvered tongue demonstrated its agency."*

When we are disappointed with the effects of arsenic, there is often a taint of gout, or syphilis, or mercury, and when combined according to these circumstances we may often succeed. "We are called to one laboring under excruciating headache, which attacks him at an early hour in the day, and regularly takes its departure in the afternoon. Day after day the attack is renewed, and the same hours witness the return and departure of the paroxysm. It has defied all ordinary methods of treating headache; the physician has pronounced it brow ague, and has promised that it shall yield to quinine or bebeerin. He is disappointed; it has resisted both; he betakes himself to Fowler's solution, and after two or three days the attack is postponed, or it comes in a less severe form, and takes its leave at an earlier hour. After another day or two it ceases altogether. We are gratified by this exhibition of the power of arsenic over periodic headache, and resolve to test it again on the first opportunity. The occasion arrives; with confidence we prescribe our remedy; we persist day after day in its use, but we are doomed to disappointment. We return to quinine, which has seldom failed on former occasions, but without success. We betake ourselves to bebeerin and supplement its powers with the alternative effects of depurants, diuretics, and laxa-

* On the Physiological and Therapeutical Effects of Arsenic, by James Begbie, M.D., 1862, p. 272.

tives, but all to no avail. We try a combination of arsenic and quinine, and in a short time the wished-for cure is obtained."*

It is well to bear in mind that neuralgic headache sometimes occurs in plethoric-looking persons; but they have not the blood belonging to this condition, and the florid countenance is more strictly due to relaxation and debility of the capillary circulation. In subjects of this kind I have found a mixture of sulphate of magnesia and quinine useful till the liver and portal circulation have been drained (Form. 29). After this, full doses of quinine, and a little brandy and water during the day, have aided the cure. Such persons have gone on comfortably for weeks and months, notwithstanding inattention to decayed teeth, and a drain from the system of various kinds.

When the subjects are excitable and hysterical, and the pain is persistent, bromide of ammonium or potassium with valerian will be advisable (Form. 72), and if anæmia is a marked symptom, iron with quinine (Form. 20 to 24), or valerianate of zinc and a stomachic (Form. 87); phosphorus and small doses of strychnia, if the nervous system is harassed by mental toil and anxiety (Form. 88–89). If there is sleeplessness, a pill of camphor, henbane, and cannabis indica (Form. 92–93) will be found of service, and it will have a most tranquillizing effect; but all drugs will fail to remove the pain, unless air, exercise, rest, and good food be prescribed.

Gelseminum sempervirens has been employed successfully in neuralgic affections, and the neuralgia arising from decayed teeth. In hemicrania and supraorbital

* Ibid., p. 276.

neuralgia it has been found exceedingly useful, but at present it is impossible to say what those cases are which will be most benefited by it. The powder and the tincture are the two forms for administration; the dose of the former is from one to two grains, and of the latter from ten to twenty minims. In the case of a lady, æt. 39, I found that one grain of the powder made into a pill with glycerin and given every night at bedtime acted marvellously, inducing sleep, and warding off a paroxysm when taken as the seizure was threatening. In large doses it appears to cause frontal headache, contraction of the pupils, and weakness of the legs.* From the observations of M. Emery-Heroguelle it acts favorably as an antineuralgic, in neuralgia of the fifth pair, dental neuralgia, the brachial plexus and intercostal nerves.†

Croton chloral has been recommended by Dr. Liebrich of Berlin as possessing a special action on the sensory branches of the fifth nerve. It is of most benefit in facial neuralgia, relieving pain and producing sleep. I have known it prove very serviceable in some cases of nervous headache in which the disorder has chiefly occupied one temple, the occiput and neck, or one parietal bone, and in other cases not only to utterly fail, but to induce sickness and nausea, if they did not previously exist. I generally give gr. x for a dose in plain water, though it has been advised to dissolve the remedy in a few drops of glycerin, and then add the required quantity of cinnamon-

* "A girl nine years old was killed in two hours by a dose of two drachms of the tincture."—*Squire's Pharmacopœia*, 11th edit., 1877, p. 148.

† Medical Examiner, Dec. 27th, 1877, p. 1067.

water, which to some extent disguises the bitter nauseous taste. On this account it may be given in the form of a pill, beginning with two grains, and increasing the dose according to the urgency of the symptoms.

I have known terrible neuralgia over one eye and side of the face follow immediately on a diffused nervous headache. There has been sickness and prostration. A teaspoonful of brandy in a little soda-water, and quinine with spirits of chloroform (Form. 12), have been retained on the stomach, and the pain has gradually departed. Twenty grains of bromide of potassium in a wineglassful of water will sometimes have the same beneficial effect.

A middle-aged lady, recently under my care, derived great benefit, and repeatedly warded off an attack of neuralgic headache, by taking, as soon as she awoke in the morning, one or two teaspoonfuls of tincture of quinia in a small cup of milk.

In the intervals of the headache remedies must be employed for improving the quality of the blood, and restoring the general health. Quinine and arsenic together are very valuable remedies (Form. 8–9), and so are cod-liver oil and fatty matters for restoring the wasted nervous tissues.

CHAPTER XVI.

HEADACHES OF CHILDHOOD AND EARLY LIFE.

Preliminary Remarks on the Significance of Headache in Children —Their Insidious Course and Character—Hereditary Disease—The Resemblance in Physical Form and Features to the Parent are not more Constant than Mental Peculiarities—Importance of checking the Transmission of Disease—The Life of Childhood contrasted with that of the Adult—Brain of Childhood compared to that of Maturity—Mental Development compared with Physical Growth—Their Relationship and Bearing on Health—Effects of Illness on the Functions of the Brain—Parents entail Disastrous Evils on their Offspring by forced Mental Discipline—Difference among Children in the Power of Memory, and Acquirement of Knowledge—Case of Arithmetical Power related by Carpenter—Evil Consequences of the Foreing System—Hypertrophy of the Brain—School Board Legislation—Weight and Size of the Human Brain at different Ages in both Sexes—Popular Tradition of delayed Mental Training—Professor Laycock's Opinion that Precocious Children are generally Strumous.

The Chief Varieties of Headache in Children: 1. Cerebral Headache. 2. Gastric Headache. 3. Epileptic Headache. 4. Febrile Headache. 5. Headache from Anæmia, Neuralgia, etc., constituting Nervous Headache. 6. Headache depending on some Intricate Change in the Cerebral Membranes or Tissues of the Brain. 7. Organic Headache.

HEADACHES hold such a prominent position in the diseases of childhood as to constitute them worthy of special notice and consideration. There are few practitioners of any experience who have not had reason to

lament the overlooking of the first symptoms of brain mischief in a young child. No fever, no vomiting, no thirst, may have been present to arrest attention; the symptoms may have been entirely subjective, and yet in a few hours the child has been struck down by a convulsion, and forthwith meningitis has followed. No parent should neglect a headache in any child under thirteen or fourteen years of age, especially in girls about this period of life, when physiological changes are in active progress.

The conventional usages of modern life, in regulating the education of children, have a tendency to push them forward without sufficient regard to physical training, the acquisition of knowledge being considered of more moment than the vigorous growth of the body and the stability of the frame. The influences which develop the general strength, and produce strong muscles and sound limbs, are counteracted in their good effects by the undue pressure which is put upon the brain when it is least able to bear the tension, and nature is thus thwarted and her wise counsels are defiantly ignored and set aside. "No perfect brain ever crowns an imperfectly developed body. When Michael Angelo reared St. Peter's dome in the air, he made every stone beneath contribute, not only to the use and beauty of the part he put it in, but to the support and power of the dome. The brain must be built up in connection with the building of the rest of the body, remembering constantly that the imperfections of the latter reflect themselves upon the former."*

Parents incur a heavy responsibility in enforcing a course of study, or a system of training, which is likely

* The Building of a Brain, by E. H. Clarke, M.D., 1875, p. 21.

to induce disorders from which they suffer themselves. The resemblance which a child bears to the parent in outward form and feature, ought to teach us how transmissible is every taint and peculiarity, which it should be our constant desire to avoid and to arrest. Some faulty conditions of the blood, and of the different fluids of the body, may be nearly stamped out by careful regimen and appropriate management, as we have seen exemplified in some members of a family who have been reared differently to the rest. But asthma, emphysema, the hæmorrhagic diathesis, tuberculous diseases, cancer, gout, and affections of the skin have a congenital origin, and here structural disease is as frequently owing to a transmitted tendency, and to a peculiar state of the blood and bodily temperament, as the family outline of the figure and face. When we consider the disorders of the brain and nervous system, there are few sensible parents who will not admit that headache is an affection more frequently hereditary than almost any other. The nervous habits, and the excitable manner of the parents, stand out in a remarkable manner where the children even have been brought up at a distance from home, and when their surroundings have been entirely changed. "There is much that is curious in the tendency to headaches thus transmitted by descent, and often going through whole families with similar character. The causes here presumably vary in different instances. Sometimes, and especially perhaps where they are periodical, the affection may belong to the gouty habit, and to the matter of gout in the circulation. In other cases abnormal structure of the vessels of the head may be concerned; in others,

again, some peculiarity in the nervous system itself."* These considerations should counsel prudence, and control the agencies at work which threaten domestic peace. Surely the cautious parent ought to consider the cheerful or melancholy temperament of his child, his mental as well as his bodily strength, and be guided in his management accordingly. The gains and losses in life, the competition and the struggles, should not be obtrusively thrust before him, for the mind will realize early enough the bitter lessons of material existence. How different is the life of childhood from that of the adult! It is the existence, as it were, of another creation; life is wrapt up in the present, and not in the future.† A child lives for himself, and not for others; his keen sensibilities move him to sorrow and to pain with great quickness; his weak reasoning power is counteracted by the activity of his imagination. He feels intuitively the approach of a friend, and knows his foe in an instant. His life is not one of mingled sorrow and pleasure; it is all one, or it is all the other—the past lights up no remorse, the future has no sorrowful forebodings. How fruitful of evil is the tyrannical oppression of the unsympathizing parent or guardian of a child, who exacts from him thought and conduct beyond his years, and, with restless caprice, despotically moulds his actions.

The weakening more and more of the overtaxed brain lays the foundation of nerve-exhaustion, and disorders

* Medical Notes and Reflections, Hereditary Disease, by Sir H. Holland, Bart., M.D., F.R.S., 1855, p. 37.

† "Children are heedless alike of the past and the future; the present is enough for them."—*La Bruyère.*

are induced which years may never overcome, even if the defective nutrition of the brain does not lead to those pathological changes which affect the bloodvessels and cerebral cells. The symptoms which announce these alarming evils are fits of recurring mental excitement, evidencing exhaustion in the functions of the brain. The amount of exercise which ordinarily maintains this organ in health now impedes the harmony of its actions, and henceforth invites those changes, which the naked eye too plainly detects in some cases, while scientific methods of research are alone capable of revealing them in others.

If, in ignorance of ensuing evil, children are pushed forward too much, fretfulness of mind is implanted, and general debility takes the firmest hold of their constitutions in the springtide of life. When a child is fast growing it needs fostering care, and all its reserve of energy, in order to approach completeness of development. If at this time it sustains damage, or injury of any kind, and one link is broken in that mysterious chain of vital forces which keeps the whole fabric in order, then the health in too many instances is appreciably undermined, and life is absolutely shortened. A closely defined plan of study carried out in defiance of the laws of health often leads to a delicate manhood. "Study and student-work aid this evolution; but, as we have seen, they are not the only factors of brain-building. Cerebration is brain-exercise; and brain-exercise strengthens and develops the brain. But the brain is evolved from the organization, and, unless the latter is normal, the evolution is imperfect. Moreover, physiology informs us that conscious, or, more properly speaking, volitional cerebration, should not be attempted too early in life. In nature's order,

the nervous system of an individual is the last to attain its full development; and, of the nervous system, the cerebral ganglia reach maturity later than any other part. Obviously the latter should not be put to work till they are capable of labor. Without exercise an organ will attain little or no development; excessive or premature exercise will monstrously develop it—in either case to the injury of the rest of the organism."* But it is worthy of consideration that the judicious culture (within appropriate limits) of the mind in early life, gives the child so trained an immense advantage over another less fortunate. He retains more after a lapse of time, because his previous knowledge calls up something familiar and already acquired which bears on the subject in hand. This holds good through life, and it is only necessary to furnish him with fresh facts, and new combinations and impressions will be easily engrafted upon the recollection. Every skilled workman from his previous training is rendered capable of acquiring an increase of knowledge from the resemblance of the present to the past, the past coming back to him when a similar subject is again presented to his mind, however remote the connection may be. The power of acquiring knowledge or of forming habits is particularly strong in childhood, when the mind is flexible and plastic. Of all periods of life, then, this is the one when impressions are most likely to become enduring, and the habit of concentration to be acquired—a period when the capacity of the brain should be carefully estimated, and the organ not pushed to dangerous excitement, which in the growing stage is more pernicious than complete disuse.

* The Building of a Brain, by E. H. Clarke, M.D., 1875, p. 44.

The development of the human brain, like the wonderful organization of the whole animal kingdom, is a subject of peculiar interest, proceeding on that grand and harmonious design which the Almighty has instituted throughout the universe. If the facts which spring from a study of vital phenomena are carefully searched and scrutinized, we shall trace the connecting link between the physical and the intellectual parts of our nature, and be in a better position to understand their mutual dependence on one another. In the earliest periods of fœtal existence, when life is just beginning to dawn, there is nothing like nervous matter, those parts corresponding to the head consisting of merely a limpid colorless fluid. The corpora olivaria are not formed till the seventh month, and at the period of birth the optic thalami and posterior ganglia of the cord are sunk amid the substance of the hemispheres (Solly). The complicated structure of the nervous system reaches perfection in the adult brain only.

An adult brain may stand an excessive amount of overwork if the physical strength is robust, but a child cannot endure immoderate exercise of the mental powers without soon breaking down, unless there is strong bodily health also. Even if the attempt is made, failure is certain. We are willing to admit the force of an argument held by those philosophers who have closely analyzed the subtle powers of mind, and have examined what it is capable of achieving. It is unquestionable that the reasoning powers are never completely developed if education is neglected or imperfect. The brain requires exercise or it will waste, and the moral strength will decline also if intellectual culture is abandoned. Take

the case of two members of the same family starting in life with an equal capacity of mind. The exercise of one brain, let us suppose, is complete and methodical, that of the other is entirely neglected. The first youth will grow up strong and vigorous in intellect, and be anxious to carry out with justice and honor the responsibilities of his situation; whilst the actions of the other are governed by selfish and ungenerous motives, or the ruling principle of his life is caprice.

No human being is so constituted as to be above physical considerations; the closeness of the connection must be apparent to all who reflect on the question for a single moment. The brain of a person whose bodily health is hereditarily weak, or who has been subjected to depressing influences, will evince earlier and greater indications of weariness than it would do if the physical conditions had been different, and the brain supplied with healthy blood.* Can a child who has recovered from fever, or an exhausting illness, prosecute his studies at once with the same delight and ease he did before the attack? A considerable length of time must elapse before his digestive system is strong enough to assimilate sufficient nourishment to restore the exhausted energies of the brain. We know his mental condition as he approaches conva-

* "The brain is clearer in vigorous health than it can be in the gloom and misery of sickness; and although health may last for a while without renewal from exercise, so that if you are working under pressure for a month the time given to exercise is so much deducted from the result, it is not so for the life's performance. Health sustained for many years is so useful to the realization of all considerable intellectual undertakings, that the sacrifice to the bodily well-being is the best of all possible investments."—*The Intellectual Life*, by P. G. Hamerton, 1873, p. 28.

lescence. He wakes in the morning after refreshing sleep, and is lively with his toys and amusements; then suddenly he becomes petulant and irritable over them, throwing them on one side in anger and disgust, till he falls off to sleep, and the jaded brain is restored. The mental faculties have sustained a shock by the illness, and the disease has impaired or temporarily suspended the powers of memory, and obliterated recent impressions. What he does acquire is easily forgotten, till the brain is restored to its former strength. Some years ago I had under my care a little boy, aged two years, who recovered from meningitis after many months of shattered health. When he reached the age of seven, and was strong in his limbs, an attempt was made to teach him to read and write; and it was found that he could give his attention for about ten minutes at a time, and that then he began to tire. At first this was ascribed to idleness and inattention, but it was soon found that perseverance in the attempt caused headache, pallor of the face, and disinclination for food; his nights were restless, and it was obvious that the continuance of the plan would be fraught with danger. His memory was not retentive, and it was more than probable that were the system continued in years to come, the brain would never be able to master more than the most ordinary details of elementary knowledge. The shock sustained at the time of the illness had impaired the cerebral tissue, and damaged the mental powers.

"Dr. Pritchard, on the authority of the late Dr. Rush, of Philadelphia, mentions an American student, a person of considerable attainments, who, on recovering from a fever, was found to have lost all his acquired knowledge."

At length, when his health was restored, "his lost impressions suddenly returned to his mind, and he found himself at once in possession of all his former acquirements."* I have seen some of the worst forms of headache supervene on acute illness, and continue when the attempt to resume study was made. A boy aged thirteen, who had a tedious attack of typhoid (in which the cerebral symptoms were considerable), always suffered from severe headache when he attempted to resume his studies, and the inference I drew from the protracted stupor and heaviness was, that the brain tissue had undergone some permanent change, and that if the course of study was continued after this warning, his memory would be irretrievably damaged, and that he would possibly pass into a state bordering on idiocy.

The privation of active exercise, and light amusements for children, by enfeebling the digestive and assimilative functions, impairs the quality of the blood, and thus disturbs and lowers the cerebral functions. The nervous symptoms shown in petulance and irritability should be serious warnings, though they are too frequently overlooked, or attributed to a wrong cause. A headache traced to confinement and study is a familiar example of this overcultivation of the intellect, and in every instance where it arises the studies should be cast aside and recreation substituted. Absolute brain repose is an urgent necessity in these cases, and the greatest literary workers in all times have sought hours of indolence to recruit their exhausted energies, and win back sleep to their wornout intellect and wearied body. "There appears

* On the Intellectual Powers, by J. Abercrombie, M.D.

to be a kind of sleep in which no mental action whatever takes place, so that the only central organs in operation are those of an automatic and reflex nature. The functions depending upon the central organs of this character, viz., circulation, respiration, secretion, digestion, etc., go on as usual."*

Moderate occupation of the mind is healthy and beneficial; excessive work is nothing less than a curse. Both independent and prudential considerations impress us with the conviction that no plausible reasoning can support the views of abstruse thinkers, who delude society by the advocacy of schemes for education, which press so hard upon the intellect of youth. They indicate a grievous lack of capacity to comprehend the fragility of a structure which is incapable of bearing any additional burden, when the struggle to support life alone is great, and conservative action is urgently needed to sustain the workmanship. Some restraint ought to be placed on the hazardous attempts of parents to force their children in the prosecution of intellectual pursuits, when the mind betrays any symptom of fatigue or weariness. The common fault to be laid at the threshold of most ambitious people is, that they take it for granted that all their children have equal natural endowments, and that what the one acquires readily, the other can equally well accomplish. No greater delusion can take possession of the understanding, and parents should be warned not to steer in a direction whence they may drift blindly into peril and danger. If they calmly consider the advice

* Hermann's Human Physiology, by Arthur Gamgee, M.D., F.R.S., 1875, p. 324.

not to expose all their children to the same ordeal, they will avoid the current which is carrying them only to the ocean of sorrow. One child is born with prodigious capabilities, and the acquirement of knowledge comes as easy to him as the digestion of the daily meal which is provided for his bodily support. Mathematical problems are solved with incredible quickness and geometrical principles are mastered in such a surprising manner that the knowledge seems almost intuitive.*

Another child of the same parents, who is equally anxious and persevering, may not have the same aptitude; he may have a feeble mind, and no amount of culture and drudgery can ever place him in the front rank of scholars, or enable him to acquire more than commonplace facts. Books are not the delight of his eyes; the bent of his inclination is not in this direction. He sees nothing to grasp at and acquire. His restless struggles to overcome this inherent deficiency of mental endowment impair the structure of a brain already weak, and too often end in miserable failure and disappointment. We may awaken the child's interest and understanding in the work he is set to accomplish, and render abstruse points clear by familiar illustration, but unless his natu-

* A case is mentioned by Dr. Carpenter, of extraordinary mathematical ability in a boy, the son of an American peasant, who had received very little instruction in either reading or arithmetic, and yet he surprised every one by solving the most difficult arithmetical questions that were proposed to him, with ease and accuracy, at the age of six years. The immortal author of the "Messiah," at nine years of age, composed the church service for voices and instruments, and at fourteen far excelled many of the most eminent musicians of his time.

ral powers are considerable, no plan of instruction can ever make him a great scholar.

The power of memory depends greatly on sound physical health; but also on original difference of constitution, which ought to be taken into account, some children being much more remarkable for the faculty of acquirement than others. This does not appear to be invariably connected with superiority of intellectual endowments, for the facts thus readily acquired are not seldom rapidly forgotten; the memory is local, so to speak, and is not accompanied by a full perception of the facts, as where the attention is complete, and the mind grasps the whole subject, and conceives it fully from every point of view. If close attention and pondering over a subject enable a child to master it in a given space of time, a habit of quick appreciation may be acquired, but the result is not usually so fixed or permanent, as where information is obtained in a more deliberate manner, and by slow and careful preparation. In reading or studying a book there are certain passages which strike the memory, and arrest it more deeply than others, which take a less abiding form in the recollection; again, there are other portions which lull the mind into a listless and inactive condition, from which it cannot be roused to engage the feelings, or awaken an interest. This is of deep importance in the training of children; for that study which comes easy and pleasant to them is the least exhausting and wearisome. A child will become tired over an uninteresting book, whilst one which amuses and pleases him is easily understood, and the facts remembered. One thought suggests another of kindred nature, and the attention being aroused by a

pleasurable excitement, there is much less effort required to master the subject. Some persons are gifted with reflecting minds, and they have the habit of intense attention and correct association. They may be taciturn in society, and be considered stupid and dull; but they carry away a knowledge of all they see and hear, and can reproduce much of the discussion, if it happens to be worth remembering. "The mental power which, in some cases, is acquired by constant and intense exercise, is indeed astonishing. Bloomfield, the poet, relates of himself that nearly one-half of his poem, 'The Farmer's Boy,' was composed, revised, and corrected, without writing a word of it, whilst he was at work with other shoemakers in a garret."* This was acquired by the power of keeping the subject, which was not a wide one, continually before his mind. When any subject of inquiry is extensive and complex, it requires logical proof to enunciate the facts, and involves protracted and laborious study. If the subject also demands great exactness and precision, the intellect is much more taxed by this nicety of detail than by a more simple generalization.

Intellectual strain and even hours of labor are to be carefully measured out according to the capacity of a child. So profound is my conviction of the danger incident on indiscriminate taxation of the mental powers, and that even children with high intellectual endowments have had their general health damaged by this forcing process, that, notwithstanding that they have in after life greatly distinguished themselves in scholastic attainments, I am convinced that a premature decay of the

* On the Intellectual Powers, by J. Abercrombie, M.D., 1871, 19th edition, p. 99.

mental powers has been invited, and decrepitude established years before such a calamity would have befallen them in the ordinary course of nature.* What greater error could possibly be conceived than to enforce close attention and drudgery over lessons when the brain feels a sense of weariness, and the bodily strength is weak? The application is imperfect, and attention cannot be given for any length of time, because the vigor of the brain is failing, and the intellectual functions are being spoiled.

It is considered certain by some pathologists that the brain of childhood may become hypertrophied, but from what causes we are not in a position to speak with any degree of certainty; beyond this, that it has generally been observed in those cases of bright children, who have given evidence of intellectual precocity; and this being so, it is obvious that the undue employment of the brain (especially if the general health is in any way defective) may lead to inflammation of the membranes, or at least to severe congestion, or serous effusion into the ventricles.†

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* "The forcing system has been by many given up; and precocity is discouraged. People are beginning to see that the first requisite for success in life is to be a good animal. The best brain is found of little service if there be not enough vital energy to work it; and hence to obtain the one by sacrificing the source of the other is now considered a folly—a folly which the eventual failure of juvenile prodigies constantly illustrates."—*Education, Intellectual, Moral, and Physical*, by Herbert Spencer, p. 60.

† "There can be no doubt that many a child has been sacrificed in early life to the pride of parents, who, delighted with the intellectual activity of their children, have striven to make them prodigies of learning. But in these cases of early and undue employment of the brain, inflammation of the hemispherical ganglion, or of the lining membrane of the ventricles with serous effusion, has usually

The anatomical changes after death are extreme elasticity and compressibility, so that the brain is too large for the cavity which contains it; the upper portion of the skull rises immediately, and the dura mater bulges out at the sides from the expansion beneath, as soon as the bone is separated from the rest of the cranium. The brain is said to be hard and pallid, owing to pressure having obliterated the bloodvessels. On making a horizontal section, the gray matter is not seen altered, and the naked-eye view displays an increase in the amount of white matter; this, according to Rokitansky, is owing, not to an augmentation in the number of nerve tubes, or their dimensions, but to the excessive development of the intervening and nucleated substance or neuroglia."* Wilks and Moxon, after stating that they have no special experience of this condition, say that in the cases that have lately occurred, the hypertrophy was unaccompanied by effusion into the ventricles, which were small, and that the actual growth of the cerebral structure "was found to be due to increase of the neurilemma, or cement between the fibres."† In adult life, as we have previously seen,‡ when the ossification of the cranial bones is complete, the cerebral contents are not liable to the same degree of variation as in children, where the brain often attains considerable size and weight. From the evidence which has been obtained by scientific research, it seems

been the cause of either a fatal issue or of subsequent mental imbecility."—Solly, *On the Brain*, 2d edition, 1847, p. 662.

* Jones and Sieveking's Pathological Anatomy, by Payne, 2d edition, 1875, p. 272.

† Pathological Anatomy, 2d edition, 1875, p. 218.

‡ See Chapter I, on the Headache of Cerebral Anæmia.

conclusively established that this disease is most likely to attack delicate and active-minded children, just as atrophy of the brain is sometimes witnessed in young subjects, when they have been struck down by chronic and exhausting illness. It would appear, then, that this and some other morbid conditions of the brain may attack children of fragile frame and intellectual energy—those in whom the senses are acute, and the imagination lively; whose constitutional debility is apparent in the smallness of the chest, and the large size of the joints; and the waste of whose nervous tissue, from overanxiety or mental excitement, is out of all proportion to the means of restoring it.

I think our school boards have something to answer for in the measure they deal out to those parents who omit sending their children regularly to school when they are not in a fitting state to exert themselves in the prosecution of their studies. There may be much to be said in extenuation of these severe measures from the ready excuses which the poor offer for keeping their children at home; but they have reason sometimes on their side, and it is only requisite to take a glance at many of the cases brought before us, to see how opposed it is to common-sense and reason to expect that such children should be supposed capable of grasping the most simple facts with health so shaken. I am frequently asked by sensible mothers who bring their children for hospital advice, and fully realize the importance of instruction, to sign a certificate recommending absence from school which they may present to the board. I find that sleepless nights, irritability of manner, drowsiness in the daytime, headache, and loss of appetite are the usual train of

symptoms, and they are just what we might anticipate when children are imperfectly fed and clothed. In nine cases out of ten, the children are anæmic, the blood is poor and impoverished, and there is a taint of consumption or scrofula in some of its forms. Some parents, in seeking advice for a child, tell me that their children are so anxious and interested in their school-work, that it is painful to keep them at home, but the effects of allowing them to go to school are debility, headache, languor, depression, and loss of appetite, till they finally break down altogether,* and this applies in a far greater ratio to girls than to boys. "Beyond doubt, the girls, from the fact that they *are* girls, are more liable to suffer than boys."† Now this in many cases is caused by the phys-

* The returns of the registrar-general in England for the year 1874 show that 30,995 deaths, chiefly among children, were due to atrophy and debility. It was the third on the list of deaths from fifteen causes, and exceeded the deaths from old age by upwards of 2000, which comes next on the list. Nervous diseases are also fearfully on the increase, and are the fifth in order. Convulsions, nearly all among children, realize the high figure of 27,139, and is the fourth on the list. It exceeded the deaths from epidemic and zymotic diseases, as scarlet fever, measles, whooping-cough, and diarrhœa, which strike down such a large proportion of our juvenile population.

† School Hygiene, by Dr. Frederick Winsor, Winchester, Massachusetts. Quoted from The Building of a Brain, p. 72.

The size of the brain may have something to do with this. "The average weight of the human adult male brain is about 3 lbs. It increases from one year old up to twenty. Between twenty and thirty there is a slight decrease on the average; afterwards it increases and arrives at its maximum between forty and fifty; after fifty to old age the brain gradually decreases in weight. Tiedemann, in his paper on the brain of the negro, states that the brain of the adult male varies between 3 lbs. 2 oz. and 4 lbs. 6 oz. The brain of men who have distinguished themselves by their talents is often large. The brain of

ical health being so delicate that the mind will not bear the strain. There is no reserve force to draw upon. How different might this have been, supposing the general health had received a full share of attention, and the culture of the mind had been neglected till a later period.

The aptitude and great desire for learning in young children physically weak and delicate is oftentimes disastrous. When the health is robust, the brain tolerates sustained attention with impunity, particularly if the exercise goes on unconsciously (as in the pursuit of pleasure), for then the brain escapes the fatigue which is the certain accompaniment of effort. The mental development of an individual is inseparably united with the growth of the physical frame, and the two should be looked at side by side in all their relationship. It is an essential property of the brain to feel every debilitating power in the smallest degree, and to call into active operation the excitability of the whole vital system. Impressions made

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Cuvier weighed 4 lbs. 11 oz. 4 dr. 30 grains, troy weight. The brain of an idiot, fifty years of age, weighed but 1 lb. 11 oz. 4 dr. *The female brain usually is lighter than the male.* It varies between 2 lbs. 6 oz. and 3 lbs. 11 oz. Tiedemann never met with a female brain that weighed 4 lbs. The female brain weighs on an average from 4 to 6 oz. less than that of the male, and this difference is already pereeptible in the new-born child."—*Solly, On the Brain*, 1847, p. 162.

"The average of both sexes differs, however, in the various races of mankind. Dr. Davis (Proceedings of the Royal Society, January 23d, 1868) found the mean of the European series to be 46.87 oz.; of the Asiatic series, 44.62 oz.; of the American series, 44.73 oz.; of the African series, 44.3 oz.; and of the Australian series, 41.38 oz. Dr. Thurnam (Journal of Mental Science, April, 1866) gives 49 oz. as the average weight of the European brain, whilst in distinguished men it amounts to 54.6 oz."—Quoted from *Carpenter's Human Physiology*, by Power, 8th edition, 1876, p. 786.

upon the brain by overexertion, when the body as a whole is in a state of debility or exhaustion, invite a degree of excitement or stimulation, which proportionately distresses and weakens it. In consequence of the presence of irritation in distant and overtaxed organs, the brain is affected, and its functions are suspended or excited according to the amount of mischief which determines the irritability. "Continued activity of a nerve diminishes its irritability in proportion to the time, and may destroy it altogether (exhaustion). In the former case rest restores the nerve to its original condition. The alterations which take place in nerves during exhaustion have not yet been made out" (Hermann). The separate functions of life cannot long be maintained in health, under any degree of excitement, without exhaustion being sooner or later felt in the entire organism. Every disturbance, from the most accidental cause, is quickly responded to, and in consequence of the influence of sympathy the affections of each are felt, till disease is complicated or incurable, through the bond of connection between the vascular and the nervous systems.

Parents may take comfort from the fact that a popular tradition is held as sound by many people, that the boy who may appear somewhat heavy and backward at first, may turn out a distinguished man at last. This tradition is not a mere fancy or superstition, but is founded on the every-day experience of people who have seen the facts for themselves, and who are not simply bent on propounding a theory. Parents may equally take warning from the fact, that mental strain encouraged to excess in delicate children is almost certain to entail disastrous consequences. If such children are absurdly pressed by

the vanity of parents, or the mistaken views of teachers, the extreme point of tension is not generally discovered till it is exceeded, and the result of early forcing is too often to produce a state of brain which, at its best, never afterwards rises above the level of mediocrity.

According to Professor Laycock, precocious children are usually of the strumous type, which he terms an approach to a "lower ethnic form," and which is more or less incompatible with high intellectual development; hence the common phrase, that "some children are too clever to live."

The question will be asked by parents, and those engaged in education: When may we put pressure on with safety? The age of the child is not a criterion, and I can conceive of no greater error than to attempt the adoption of any general rule which shall be applicable to all cases, for children differ widely from each other in a hundred ways, and what will prove a healthy stimulus to some will exhaust and overthrow others. If a child has had his intellect carefully and slowly unfolded, he will be in a very different position at six or seven years of age to one whose culture has been neglected up to that time; the memory may be exercised with safety, and the gift of imitation so strong in childhood made use of from a very tender age. The mind, like the body, is amenable to rational management, and when this is gradual, and not premature or forced, the facility of acquirement will be all the more ready. The process of additional pressure must be conducted with a full appreciation of what the child can accomplish with pleasure, and must not cause weariness. This appears to be about the only rule we are justified in suggesting, and we must discriminate

between the strong vigorous child who can bear the pressure, and the weak excitable child who is probably of the two the more willing and anxious to learn. Looking at the physical health of a child, as a means of judging of its mental strength, I think the commencement of the second dentition is the earliest period when instruction requiring brainwork can be safely pushed. Even then the knowledge should be of a kind which accords with the evolution of the different faculties, or the mind will become disgusted with the difficulties placed before it, and not having mastered simple subjects, it will be unfit to receive more complex ones; hence precise methods of instruction, and exact definitions, if attempted too soon, will be fraught with evil, and the child will languish under the accumulation of facts with which its mind is weighted.

Let us, then, consider the question of dentition in its relation to the physical and mental growth of childhood. The eruption of the first set of teeth is determined by the state of the nervous system, the quality of the food that is supplied, and the surrounding conditions of pure air and water; it is much more delayed in some children than in others, and notably in those who are weakly and delicate, or whose development is retarded by a rickety constitution. When it does commence the nervous system is disturbed, and convulsive affections not unfrequently ensue. Now, if convulsions happen from time to time the nerve-centres are rendered still more excitable, and the brain is weakened, which weakness may show itself at the time of the second dentition.

The period of the second dentition, which begins about the seventh or eighth year, must be reckoned, from this

point of view, the most important period of childhood—the period when educational training should be cautiously proceeded with, because then the physical growth is very active, and the animal functions are proceeding with extraordinary rapidity, and a large amount of rest and sleep are required for the building up of the tissues. This period in some children is of much longer duration than in others, lasting in weakly, rickety subjects till thirteen or fourteen. The rule of the Factory Laws does not allow a child to work before the age of nine, and at thirteen only nine hours a day, the gradual development of the teeth being taken as the best standard of physical capability, and a more reliable test of age than height, because it is very well known that the tallest children are generally the most weak and fragile (*Carpenter's Human Physiology*, page 1105). During childhood the digestive organs are very active, and derangements which are brought about by perverted nutrition are especially common. If disorders of the digestive organs become chronic, any trifling cold may provoke an inflammatory attack, and hence tuberculous diseases are frequent, a latent strumous diathesis being called into activity. Any immoderate intellectual training at a time when the digestive organs are enfeebled, and the appetite poor, may so impoverish the quality of the blood as to increase the irritability of the nervous centres. Two instances of this kind have come under my observation, where delicacy of the general health, with ordinary mental exertion, was followed by tubercular disease of the brain in young, bright, clever lads, aged respectively eight and eleven years. In neither instance could any blame be attached to the mental training; but the physical health

in both cases had not reached that standard of strength, or perhaps could not reach it, which admitted of any tension or concentrated employment of the faculties.

Some children are naturally quick and active-minded, and they will make rapid progress in their studies, and achieve with ease what is unattainable by others; or, at least, if it is accomplished by another child, it is at great expense, and at the possible risk of a complete breakdown. It is undesirable to make a great demand upon the intellectual powers till the completion of growth, when the demands upon the system are distinctly lessened; all the functions of life cannot bear severe strain at the same time, and therefore advantage should be taken of the intervals of growth when it is comparatively quiescent. How frequently does it happen that a long and trying illness has kept a boy from school, and he has lost so much time that it seems impossible that he can make it up again; yet, on recovery, the period of inactivity has had a most salutary effect, and he is not long in coming up to the level of his competitors and rivals.

I have adopted the following classification of headaches:

(1.) Cerebral headache, attributable to injury, or to acute or chronic inflammation.
(2.) Gastric headache, from intestinal and hepatic derangement, known as bilious headache (*sympathetic headache*).
(3.) Epileptic headache (*congestive headache*).
(4.) Febrile headache (*active hyperæmia or active congestion*).

(5.) Headache from anæmia, neuralgia, etc., constituting *nervous headache.*

(6.) Headache depending on some intricate change in the cerebral membranes or tissues of the brain.

(7.) Organic headache.

(1.) *Cerebral headache* seems to me an appropriate term for a variety of headache, which has supervened on a blow or injury to the head. The slight concussion so induced has interrupted the functions of the brain, and disturbed the circulation. No notice is taken at the time of the accident, although there may have been disturbance of sensation, or voluntary motion, giddiness, and even nausea may have been the evidence of disturbance; but, passing off quickly, neither the patient (if old enough to reflect on the cause) nor the friends have a notion that so slight an injury could be associated with the oppressive headache which ensues. The circumstances under which the brain usually reveals its weakness are the exercise of the intellect, chronic illness, deficient food, and imperfect ventilation. The brain cannot tolerate any ordinary strain without becoming exhausted, and the intellect is so enfeebled that in many cases all attempts at education have to be given up. The headache is almost invariably frontal, and I would go so far as to hazard the opinion that the anterior lobes never escape. In some cases the pain is also occipital, but I have seldom observed it exclusively in this situation, and when it has been severe, the pain in the forehead has been less intense and overpowering. No degree of pain in the back of the head, according to my experience, produces such vital prostra-

tion and loss of energy, as a less degree of suffering will occasion in the frontal region. The patient has a dull and languid look; there is no animation in the expression; the eyes are sunken in the orbits, and move sluggishly; the lower eyelids are dark, and the face is pallid and drawn; the skin is cool, and the extremities cold or chilly, because there is a disinclination to exertion; the pulse is soft and slow, and the bowels disposed to constipation. The psychological symptoms are an alteration in ordinary manner and character, so much so that the friends tell us that he is not like the same child. He takes no interest in anything, and lies about in one corner of the room, as though depressed or unhappy; he will doze in the daytime and sleep soundly at night. Petulance and irritability are not features of this condition, the nerve-centres not being so much involved (at least primarily) as the vascular system, which, being overloaded, the want of contractility in the vessels favors congestion and serous exudation into the brain-structure itself. Cases with a history of this character cannot receive too much attention, and the prognosis should always be careful and guarded. Trifling excitement may set up inflammatory action, or renew the congestion, which it is so necessary to remove before the brain has sustained irreparable injury. For this congestion, becoming localized, may lay the foundation of a tumor or morbid growth, and our attention in after years is not directed to the injury till continuous or paroxysmal pain in the head, loss of power in the limbs, defective vision, or obstinate vomiting indicates the presence of serious mischief in the brain. If the case goes on, the general weakness increases, and the child is laid up, giving every one the idea,

by his looks and manner, that he is laboring under disease of the brain. Any indiscretion in diet causes flushing of the face, accelerated pulse, and often vomiting. Not unfrequently the symptoms increase in severity, and meningitis ensues; there is rigidity of the arms and legs, the head is thrown back against the spine, the thumbs are hidden in the palms of the hands by the flexor tendons, the cheeks are flushed, the temperature rises, and the bladder is paralyzed. Now the respiration becomes sighing and irregular, the bowels act involuntarily, the child cannot be roused to swallow anything, and convulsions or coma usher in death. After death, in such cases as these, there may be presented on a post-mortem examination the evidences of extreme congestion in the veins, ramifying over the dura mater, and in the sinuses and base of the brain; the lateral ventricles may contain serous fluid in excess, and when the brain is sliced, the puncta vasculosa are everywhere turgid with blood, which oozes out gradually from their open mouths after section. It is important not to ascribe too hastily to inflammatory action what in reality may be due to excessive congestion. When the symptoms of meningitis are well marked in young children, they may generally be assigned to tubercle. If there is much elevation of temperature, and fever, we need have no hesitation on the subject. But a more slow and insidious form of meningitis may arise. In these cases the temperature is normal or nearly so, the pulse is habitually slow, but rises rapidly on any excitement or after food; the limbs waste and become powerless, the child is irritable and fretful; he sleeps badly at night, and is so restless that the clothes cannot be kept over him. These are the most favorable cases. The in-

jury has been so slight as to provoke into action a slumbering strumous diathesis, or a delicacy of constitution, which but for the accident may never have been developed, or certainly not till a later period, when the intellect has been subjected to extra exertion, or the child has been struck down by an eruptive fever or exhausting diarrhœa.

The *treatment* consists in subduing any congestive or inflammatory symptoms that arise, by careful diet and the observance of strict hygienic rules, the avoidance of all excitement, and everything that tends to disturb the equanimity of the mind; for children become quickly alive to surrounding circumstances, and mentally appreciative of all that goes on around them. In some cases that have fallen under my notice, counter-irritation at the back of the neck has answered well, especially if there has been pain in the occiput, and the muscles are stiff. If the child is not old enough to complain, he will often raise his hand to the back of his head to indicate the seat of mischief. I saw a male child in November, 1876, aged fourteen months, who had cut most of his teeth with comparative ease, except with one slight convulsion six months previously. About three months before I saw him, he struck his head; and although no bad consequences ensued till the present illness, when I saw him in consultation with the ordinary medical attendant of the family, I have no doubt of the accident having laid the foundation of the congestion and meningitis, which carried him off after four days, from gradual unconsciousness passing into deep coma.

(2.) *Gastric Headache* (Sympathetic Headache).—This is not uncommon in children, from errors in diet, and

overfeeding; but it is less frequent with them than with adults, who are more prone to irregularity in eating and drinking. It is to be understood, however, that gastric disorder, or sympathetic dyspepsia, is often met with from irritation elsewhere; for instance, it may be the result of ascarides in the rectum, or worms in the bowels; but we must not forget that the real cause of the disturbance may be inflammation of the brain or its membranes in children. Irritability, peevishness, languor, may give rise to reflex irritation, as we have seen in the previous chapter. Where the brain is affected, vomiting is a constant symptom, and in those who die, the mucous membrane and its larger extremity is found digested, or dissolved by the gastric juice,—a proof that the irritation of the brain excites, at least in many cases, untimely secretion of gastric acid (Budd, *On the Stomach*, p. 193). Andral has pointed out that these patients often throw up a large quantity of greenish bile with painful efforts. In addition to pain and tenderness at the epigastrium, there is in most cases severe pain in the head. This disease also occurs in children from tubercular disease of the lungs, and it is not uncommon during the first dentition, at the time of weaning, if they have been reduced by the eruptive fevers, or by improper food and impure air. They are thirsty and fretful, the vomited matters are sour, and the bowels loose, and the motions greenish. Exhaustion may set in with coldness of the surface, and death. In infants the gums should be lanced, and a diet of milk given, or a wet-nurse procured, as the case may be; and bismuth, magnesia, logwood, and krameria given, with aromatic spirits of ammonia, hydrocyanic acid, morphia, etc. It is most common in children who are reduced by previous

illness, and who are fragile and excitable. In many cases of this sympathetic disorder there is no remedy that will give relief till the irritation of the blood and brain subsides. The stomach secretes unhealthy mucus, which causes fermentation in the starchy principles of the food, and lactic acid is formed, which disturbs both stomach and bowels. The gases generated by the stomach where flatulence exists are carbonic acid, nitrogen, and sulphuretted hydrogen; and there is nearly always headache in these cases.

These headaches in children are constantly due to the choice of food and drink, and to preserve health and strength it is obvious that the supply should be in suitable proportions, according to age, sex, and occupation. "Thus we may estimate that a child of eight or nine years of age, as contrasted with a full-grown adult, actually gives off, relatively to the weight of its body, one and a half times as much carbonic acid; and the same rule probably applies to its urea."* It stores up in its body a larger portion of the constituents of its food, and a smaller quantity of effete matter is dismissed from its body by the various emunctory functions; and it consequently becomes apparent why the food in the case of children should be purer and easier of assimilation than in adults, whose powers of assimilation are so much stronger, and are capable of chemically converting into the textures of the body ingredients which the feeble power of digestion in young children is incapable of transforming. "The morphological and chemical changes, for example, which transform the cartilaginous femur of

* On Food and its Digestion, by W. Brinton, M.D., 1861, p. 426.

the infant into the bone bearing the same name in the adult, imply such large and incessant demands on the part of its organism for lime, magnesia, and phosphoric acid, as may well suggest the possible magnitude of the contrast in the proportions of these inorganic substances required to be present in its food. Nor does the circumstance that such a contrast is probably only quantitative, much affect the deducible result."*

(3.) *Epileptic Headache* (Congestive).—The headache that accompanies epilepsy is deserving of some consideration; and to those who are the unfortunate subjects of it, it will be found a frequent and distressing symptom. Drowsiness, lethargy, heavy sleep, disturbed dreams, and want of animation are premonitory symptoms of the attack, so frequent as not to be disregarded. But headache is more commonly a consequence of the attack, and as such it chiefly concerns us at present. Of fifty-six cases recorded by Dr. Sieveking in which headache occurred, it was constant or frequent in twenty-eight cases; it occurred before the fits in four cases only, after the fits only in twenty-two cases, and it occurred both immediately before and after the seizure in three cases.† These headaches are of a congestive character, and they present a different class of symptoms in some cases to what they do in others. If the epileptic is of the sanguine temperament, and of full habit, the headache is accompanied by heat of surface, throbbing of the temporal vessels, and fulness of the veins about the scalp; the face is sometimes flushed and the eyes suffused, the patient cannot bear the approach of light, and if he sleeps he wanders

* On Food and its Digestion, p. 427.

† On Epilepsy, 2d edition, p. 59.

and is disturbed and restless. This condition, in fact, is an acute form of congestion or hyperæmia of the vessels, such as we get in the headache which attends the early periods of some acute diseases, as pneumonia, whooping-cough, and that which I shall next describe as *febrile headache*. In other cases, again, the congestive headache is more passive. It is better described as passive hyperæmia, on which we have dwelt in an earlier chapter. The effect of the epileptic paroxysm is to disturb the equilibrium of the circulation, and to induce relaxation in the vessels, while a tardiness of the circulation springing from the central organ of life—the heart—favors a blood stasis in the sinuses and vessels of the brain. That epilepsy should induce severe headaches when the attacks are frequent is just what we might reasonably anticipate, seeing that the effect of repeated paroxysms is to damage the nervous substance of the brain, to impair the memory, and to lead in some instances to idiocy, or even dementia.

I have met with most agonizing cases of headache in children the subjects of mitral regurgitation or insufficiency. In one case which was under my care at intervals for upwards of three years, the suffering was acute and unremitting; the poor girl presented the appearance of a much older person, the cheeks had a dusky crimson flush on them, and the brain was habitually overloaded with venous blood. The superficial veins of the neck and scalp were distended, and the temporal arteries throbbed violently, for the occasional epistaxis, which had brought relief from time to time, had long since ceased to recur. Active purgation, by means of a grain of calomel at night, and a febrifuge and saline aperient,

failed on some occasions to give relief, and I was compelled to leech the temples, which for a time lessened the tumultuous action of the heart, and alleviated the headache.

Treatment.—This must be regulated according to the strength and constitution of the patient. If the child is of a nervous disposition, the surface pale, and the circulation languid, small doses of strychnia with a mild preparation of iron will be useful, by increasing the tone of the system generally, and a stimulating liniment at the back of the neck will relieve the headache. The extremities should be kept warm, and moderate exercise encouraged. Sponging the body with Tidman's sea salt will be beneficial; it improves the force and character of the capillary circulation, and in some degree removes the liability to headache and cerebral congestion. In the case of stronger children, a calomel purge, followed by a saline aperient in the early morning, will be necessary, if the bowels are disordered, or worms are suspected. Sulphate of zinc, in a bitter infusion, is a remedy worth trying in some cases; it improves the appetite, and imparts a degree of vigor to the digestive functions which relieves the oppressive headache. If, however, the headache is continuous and acute, bromide of potassium alone, or combined with bark, ammonia, or valerian, will be advisable till its severity is mitigated; and when the pulse is quick and unsteady, or anæmia is present, digitalis with iron may have a beneficial effect, by reducing the venous fulness and promoting the force of the arterial current.

(4.) *Febrile Headache.*—I speak of this variety of headache because the brain is active and susceptible in

young persons, and the circulation being additionally excited by the fever process, the vessels convey a larger quantity of blood to the brain than they do in health. If the subjects of fever are robust and strong, the hyperæmia of the vessels is all the greater. In typhus fever the headache is frequently most intense—dull and heavy across the forehead and in both temporal regions. Sometimes the pain extends over the whole head, and is not confined to the vertex or occiput; nor is it so throbbing, darting, or bursting as in relapsing fever or the headache of some other febrile disorders. In the typhoid fever of children there is usually dull frontal headache, and the mental faculties are disturbed; sometimes delirium or convulsions ensue, but more frequently there is a moderate degree of headache during convalescence, if the patients have exerted themselves too much, or have been awake too long, or without food. In all acute diseases we should be on the lookout for headache, as it is of common occurrence in pneumonia, bronchitis, whooping-cough, and the various exanthemata. I have observed it extremely severe in scarlet fever and measles, particularly before the eruptive stage is fully developed.

In the *treatment* of headaches complicating these febrile affections, a few leeches to the head, cold affusion, or the ice-cap, will sometimes be advisable to control the vascular excitement within the head, and reduce the activity of the cerebral circulation; whilst the specific diseases on which they depend must receive proper attention.

(5.) *The headache of anæmia, neuralgia,* etc., may be classified as *nervous headache,* and the description given in the first and seventh chapters will be found to

include all that is important under this variety in children. *Neuralgic headache* usually afflicts those of a timid and delicate constitution, and if they have been reduced by acute or chronic disease, it is readily excited in them. I have met with it in boys and girls whose intellects have been overtaxed during study and confinement to long and wearisome lessons. It is also induced by indoor confinement and bad air, though it is not so common from these causes as the congestive form of headache, in which the vessels are overdistended. Dr. West says: "It does not by any means depend on overstudy, though I do not ever remember meeting with it in children who have not yet gone into the schoolroom; and I have frequently found it dependent on too continuous application, though the number of hours devoted to study in the course of the day may not have been by any means excessive."* From my own experience I have certainly observed it quite as often among children whose intellect has not been overtried, or even exerted at all; and I am inclined to the view that any depressing causes, or unhealthy surroundings, are capable of exciting it into action. I have seen a bad attack in a boy, aged fifteen, whose nervous system was reduced by a long and trying local disorder. Neuralgia of the ophthalmic and temporal branches of the fifth nerve, succeeding lymphatic obstruction and painful muscular spasms in one lower limb, were experienced on several occasions. He was often kept awake at night, and had become so nervous, that sleep could not be obtained till he took some brandy and water, and the attack was only removed by a generous

* On some Disorders of the Nervous System in Childhood (Lumleian Lectures, 1871), p. 15.

diet, and full doses of quinine three times a day. Whenever at his best time he took a longer walk than he was able to accomplish with comfort, he was liable to headache. I have known fearful neuralgia to come on in delicate girls of thirteen or fourteen, who are approaching the catamenial period, but in whom it has not appeared, or is delayed, particularly if the intellect has been strained, especially where the temperament is over-anxious. These patients are more frequently seen in the out-patient department of our hospitals than in private practice, for poor living is a great determining cause. They are pale and anæmic, and some of them have been thrust into situations of hard work, which they have not the strength to fill; and if there is cough and loss of appetite, a consumptive tendency can be frequently detected.

A case of supraorbital neuralgia is recorded by Mr. Nunn in a young lady about eleven, which yielded to lancing of the second molar tooth.* A similar case also came under my own notice in a girl of ten, who had suffered very severe headache for many weeks. The first molar tooth on the left side was extracted, and from that time the patient began to recover. Headache from dental caries is more rare in children than adults.

In one case that came under my care in October, 1876, pleurodynia was added to the acute supraorbital and temporal pain, and there was a fearful degree of apprehension and nervousness. This assemblage of symptoms was mainly brought about by the ordinary causes which in-

* See a paper on Irritation of the Dental Nerve, in British Medical Journal, May 5th, 1877.

duce anæmia. In the case of a little girl, eight years of age, who first came under my care in November, 1876, with cardiac spasm (angina pectoris), there was pallor of the face, weak pulse, and headache of a neuralgic character supervening. If the second dentition is delayed, and the teeth are slow in appearing, neuralgic headache, involving the branches of the fifth nerve as they ramify over the brow and temple, is oftentimes very acute in boys and girls. The symptoms which denote neuralgic headache are localized pain in one temple, or half of the forehead, coming on in paroxysms; very frequently it is situated over the brow, or supraorbital ridge, and the ball of the eye is tender. The pain seldom extends across the forehead, but remains limited to one side of the head, and either passes superficially beneath the muscles of the scalp to the occiput, or in stabbing paroxysms through the eye itself, in the same direction. Vomiting is not a frequent symptom, nor yet the disposition to refuse food; but when the attack is severe, and one eye is much affected, there will be nausea and sickness, tears will course down the cheek, and light and sound will increase the suffering. Sometimes this is so violent that the patient has fainted away, and the timidity of the child's nature has been so nurtured by it, that it could not sleep alone, or be left in the room at night without a candle. Sometimes the pain will come on in the morning, and depart after a good meal, or it will occur in the evening when the child is exhausted, and ought to be in bed. The pulse is usually small, excitable, and quick, or even intermittent, and the emotions are so sensitive that the child will cry at the expression of any word that savors of the least harshness. When the pain is of such con-

tinuance as to reduce the child's health, the intestinal secretions are disordered, and the urinary secretion is excessive, or it abounds in lithates. The whole expression is one of languor and exhaustion, and the child is incapable of any mental exertion. In the intervals of pain there may be a full display of cheerfulness, and the stupor and indifference which betoken organic disease of the brain are absent. The attacks are not of long continuance, and they pass away entirely, leaving the patient quite cheerful, to return again in a week or fortnight.

I do not think we ought to make a mistake in diagnosis, though in some cases it is perplexing, where the symptoms are not so marked as I have described, and especially in very young children about the period of their first dentition, in whom neuralgia is sometimes met with. Nervous affections and general increase of sensibility are common enough in young children about this time, or in older children after a long and exhausting illness, as chronic diarrhœa or typhoid fever. We should be cautious to ascertain whether the pain in the head is continuous and unremitting before we commit ourselves to an opinion, or carry out any plan of treatment. Having made out our diagnosis, and satisfied ourselves that the cerebral tissue is not implicated, we do not in any way become anxious about a neuralgic seizure, for though it robs life of much enjoyment, it does not tend to shorten it, and in these cases it passes off as the health improves. Severe pain, local and either continuous or recurrent, if attended with nausea, vomiting, or constipation, ought to put us on our guard against meningitis or cerebral tubercle; nor should these symptoms delude us if they pass off, for they may, notwithstanding, be

due to lurking organic mischief, and have a fatal termination at no distant period. Many years ago I met with an instance of headache in a girl fourteen years of age, chiefly frontal, which had continued on and off for months and caused, as headaches often do, no anxiety among the parents. When the head was very painful, the child was kept from school, and when the suffering passed away, school-work was resumed, the health of the child being at all times delicate. After the headache had troubled her more or less for a year, inflammation of the meninges accompanied by convulsions, set in, and the child lost her life. There were no gastric symptoms present to attract attention to the stomach, and the headache, undoubtedly due to cerebral exhaustion in the first instance, was followed by inflammatory action which could not be traced to tubercle.

Treatment.—This consists in enforcing rest, if educational zeal has been carried too far, and getting the general health amended in every possible way, that the nervous tissue may be improved, and degenerative changes prevented. Quinine, cod-liver oil, fresh air, and absolute rest of mind and body are important at this early period of life. For the medical treatment, the plan to be adopted is much the same as that recommended in the chapter on neuralgic headache in adults, and the formulæ in doses suitable to the age of the child will be equally appropriate.* Dialyzed iron, either in the character of syrup, or an aqueous solution, is an excellent preparation where it is sought to improve the quality of the blood, and to remove the anæmia (Form. 24 *a*). As it is almost

* See Chapter XV, on Neuralgic Headache.

tasteless, no child will refuse to take it, and, unlike many other preparations of iron, it is readily absorbed, causing neither indigestion nor constipation.

(6.) *Headache depending on some intricate Change in the Cerebral Membranes or Tissues of the Brain.*

This condition I have oftener observed among hospital out-patients than in private practice. The children are generally from three to eight years of age; they gradually fall into a delicate state of health, and cause anxiety in the minds of their parents. In some cases there is the hereditary tendency to struma and consumption, nervous disease, or syphilis; in other instances, irregular and drunken habits on the part of the father have implanted a liability in his child's constitution to take on nervous disorder. Frontal headache is the first symptom of which any complaint is made; the child is lethargic and indisposed for exertion, the mind strays and wanders from any pursuit or occupation, and the intelligence is dull and totally incapable of strain or concentration. The child's disposition is much changed; if he has been bright and cheerful before the illness overtook him, he is now listless and dull, or he is so excitable that, if thwarted in his plans or wishes, he becomes exceedingly fretful and quarrelsome. When playing with his companions, he is liable to outbursts of passion, and goes into such a state of frenzy that he may inflict bodily harm on those about him. After a fit of temper, or looking over a book, the child will suddenly become drowsy, and rest his head on a table or chair, and fall off to sleep. It is the sleep of exhaustion, but quiet and profound; the skin and head

are often perspiring, and when he awakes he is unrefreshed. At night he is restless, tossing off the clothes, and in the morning is fretful and irritable, as though the sleep had done him no good. The pulse is soft and quiet, occasionally intermittent, but there is an absence of cardiac disease; there is no sickness and no elevation of temperature; the tongue is clean, and the bowels regular, or disposed to constipation. In fact, it is not a condition of meningitis, though there is no reason whatever why such cases in pursuing a downward course should not lead to inflammatory mischief in the brain or membranes. Rather, the tendency is to cause an anæmic state of the blood and tissues, and an increase of serum in the lateral ventricles, and beneath the arachnoid, or between the sulci of the convolutions. If this goes on, the head occasionally gets larger at the sides and more prominent at the forehead, and this appears all the more obvious as the child loses flesh and the face shrinks. In rickety children this headache is not uncommon, and recovery is the more slow and tedious. I have observed it among boys who are fond of school and books, particularly if they are of a nervous or sensitive temperament, when they become overanxious with their studies, and this worry is very prejudicial to the nervous system. If the health is naturally delicate, and the food unwholesome, and the boys are deprived of air and exercise, they are the more likely to be victims to this form of suffering. As to the pathology of this affection, there can be no doubt of its being one of exhaustion, and the cerebral texture is more exsanguine, and less firm than in health. I think there is nothing incompatible with recovery, if the blood improves in quality, and the brain is better

nourished. Pure air, wholesome food, and proper medicine will be required. Whilst the pain lasts, and the excitability of the nervous centres is great, there is no remedy like bromide of potassium, combined with small doses of belladonna, and, in some cases, with iodide of potassium. If bark or quinine is ventured on too soon, the headache returns with its former violence; and the same will happen if iron or strychnine is had recourse to before the brain is strong enough to bear a sudden influx of blood into its vessels.

(7.) *Organic headache in children* arises from the same set of causes as in adults. Any morbid growths from the bone or membranes, or from the white or gray substance of the brain itself, usually induce severe pain in the head, and such physiological symptoms as serve to indicate with tolerable accuracy the situation of the mischief. Unfortunately, the condition in too many instances defies all treatment from medicine, and surgery is equally powerless. Cancerous or fungoid growths may spring from the dura mater, and in extending outwards cause absorption of the bone, and elevation of the tissues of the scalp, resembling an encysted tumor. When interfered with they cause convulsions and death. These growths rarely implicate the bones, which often present obstruction to their progress, but at times the hardest structures do not oppose the direction which they take. Tumors having this perforating tendency may also grow from the diploe, and even from the cellular tissue beneath the arachnoid and pia mater, and from the cerebral substance itself. It is a curious fact connected with these tumors, that they often attain considerable size before they produce any disturbance in the functions of the brain; and

post-mortem examination has occasionally revealed their presence in the substance of the brain, when no symptoms to attract attention to the brain have been observed during life. This depends in a great measure on the situation of the tumor, for one which is imbedded in the substance of either hemisphere, and does not press on the sinuses, or falx, or tentorium, is less likely to cause pain or uneasiness.* Even a cancerous tumor may arise as a primary disease in the brain of a child, and pursue a slow and tedious course, setting up no disturbance, unless by increasing growth or pressure it should involve the membranes and excite inflammation. A case of this kind is related by Mr. Solly, in a child only four years of age.† The chief symptoms were drowsiness and inactivity for some months, followed by an epileptic seizure. Under the use of mercurials and purgatives, the child apparently got well, but after a time he became again sleepy and forgetful; his intellect was impaired, and he died at the

* A case is related by Andral where an osteo-fibroid tumor was attached to the tentorium, and this caused such pressure on the cerebellum as to diminish its volume, and change its texture into one of extraordinary hardness. The tumor was traced to a fall four years before death, and the leading symptoms were no uneasiness at the time of the accident, but later on a dull pain at the left part of the occipital bone; giddiness from time to time, and occasional loss of consciousness for a few minutes. Later on, the upper extremity of the right side was attacked with a painful tetanic shock. Five or six of these shocks followed each other rapidly, and then intervals of months elapsed; then they became more frequent, limited to the right arm, and paralysis of this limb came on, at first transient, and afterwards more complete. The right lower extremity also lost the power of motion, but there was no convulsive movement.—Solly, *On the Brain*, p. 647.

† Solly, *On the Brain*, p. 648.

end of six months from the time of the epilepsy. After death a tumor was found in the posterior lobe of the left hemisphere, the size of a hen's egg. Neither the membranes nor the substance of the brain were more vascular than usual. *Tubercular* tumors of the brain are far more common in the case of children than the other varieties, and they more frequently involve the substance of the hemispheres and cerebellum than the membranes which are liable to inflammation; in fact, tubercle of the brain is very prone to induce inflammation and effusion into the ventricles. The symptoms are severe headache, continuous or paroxysmal; then passing off to recur again with convulsions, insensibility, and coma. After death it is not uncommon to meet with flattening of the convolutions, effusion into the ventricles, and a hard portion of yellow tubercle, varying in size from a marble to an egg. As I have previously mentioned,* severe headache with vomiting, constipation, impairment of intellect, convulsive movements, paralysis or coma, disturbance of vision, etc., are the prominent symptoms of headache due to organic change.

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* See Chapter XIV, on Organic Headache.

FORMULÆ.

(1) ℞. Potass. Citrat., ℈j.
Inf. Digitalis,
Inf. Buchu, āā ℥ss.
Misce.—To be taken three times a day.

In uræmic headache, with deficient renal action.

(2) ℞. Potass. Citrat., ℈j.
Spt. Juniperi, ʒj.
Æther. Nitr., ♏xx.
Decoct. Scoparii, ℥j.
Misce.

In the same cases as the above.

(3) ℞. Potass. Bitart., ℥ss.
Syr. Limonis, ℥ss.
Aquæ ferventis, Oij.
Misce.

To be taken during the day and night in the same cases, where the urine is scanty and the bowels sluggish.

(4) ℞. Hydrarg. Bichlorid., gr. j.
Tinct. Ferri Perchlor.,
Glycerini, āā ℥ss.
Aquæ puræ, ad ℥xij.
Misce.—A tablespoonful in an equal quantity of water, or one ounce of Infusion of Quassia, three times a day.

In anasarca and anæmia, where the headache is due to renal congestion, and in some forms of syphilitic headache when the cachectic state is well marked.

(5) ℞. Quiniæ Disulph., gr. x–gr. xv.
Acid. Sulph. Dil., ♏x.
Syrupi ——, ʒij.
Aquæ, ad ℥jss.
Misce.

To be taken in headache from malarial poisoning, two or three hours before the expected paroxysm. Afterwards, a third part three times a day till cinchonism is produced. (Dr. Smith.)

(6) ℞. Liquor. Fowleri,
Tinct. Belladonnæ, āā ʒj.
Aquæ puræ, ad ℥jss.
M. Sig.—A teaspoonful in a wineglassful of water three times a day.

In the same cases, where the headache recurs from time to time.

(7) ℞. Quiniæ Disulph., ʒss.
Acid. Arseniosi, gr. j.
Nitric. Dil., ʒj.
Aquæ puræ, ad ℥j.
M. Sig.—Thirty drops in a wineglassful of water three times a day after food.

In similar cases to the above. (Dr. Routh's formula for giving Arsenic.)

(8) ℞. Liquor. Cinchonæ, ♏xx.
Fowleri, ♏v.
Aquæ puræ, ad ℥j.
M. Sig.—To be taken three times a day after food.

In neuralgic headache and cerebral anæmia.

(9) ℞. Liquor. Fowleri, ʒj.
Tinct. Quiniæ, ℥jss.
Mist. Camph., ad ℥vj.
M. Sig.—℥ss three times a day in a little water after food.

In neuralgic and periodic headache.

(10) ℞. Liquor. Potass. Ars., ʒj.
Tinct. Quiniæ, ℥jss.
Hydr. Bichlor., gr. ss.
Aquæ, ad ℥vj.
Misce.—A tablespoonful in a wineglassful of water three times a day after food.

In neuralgic headache, where a mercurial is desirable, and there is the history of syphilis.

(11) ℞. Liquor. Potass. Ars.,
Potassæ, āā ʒj.
Tinct. Colchici, ʒij.
Lavand. Co., ʒiij.
Aquæ puræ, ad ℥vj.
Misce.—A tablespoonful in a wineglassful of water twice a day after food.

In neuralgic headache associated with the gouty diathesis.

(12) ℞. Tinct. Quiniæ, ʒxiv.
Spt. Chloroformi, ʒij.
Misce.—A teaspoonful in a wineglassful of water twice or three times a day.

In neuralgic and nervous headache.

(13) ℞. Tinct. Quiniæ, ʒvj.
Potass. Bromid., ʒj–ʒij.
Glycerini, ʒij.
Mist. Camphoræ, ad ℥vj.
Misce.—A sixth part twice or three times a day.

In neuralgic and nervous headache.

(14) ℞. Acid. Hydrobromici, ʒvj.
Quiniæ Disulph., gr. xij.
Inf. Gent. Comp., ad ℥xij.
Misce.—Two tablespoonfuls twice or three times a day.

In neuralgic and nervous headache, where Quinine alone disagrees.

(15) ℞. Sodæ Bicarb.,
Bismuth. Subcarb.,
Pulv. Acaciæ, āā ʒj.
Spt. Amm. Arom., ʒij.
Syr. Zingib., ʒiij.
Aquæ puræ, ad ℥viij.
Misce.—Two tablespoonfuls three times a day half an hour before food.

In dyspeptic headache with flatulence, acidity, and pyrosis.

(16) ℞. Amm. Carb., gr. iv.
Aquæ, ʒj.
Misce.—To be taken every three or four hours.

In dyspeptic, neuralgic, and nervous headache, and in some forms of gouty headache.

(17) ℞. Spt. Amm. Arom., ♏xl.
Chloroformi, ♏x.
Aquæ, ad ʒj.
Misce.—To be taken every three hours.

In dyspeptic and nervous headache.

(18) ℞. Sodæ Citro-Tart. Efferv., ʒj–ʒij. (B. P.)
To be taken whilst effervescing in the third of a tumblerful of cold water early in the morning.

As a mild aperient in dyspeptic or bilious headache, with nausea and sickness, and in plethoric headache.

(19) ℞. Magnes. Sulphat., ʒvj.
Carb., ʒj.
Tinct. Lavand. Co., ʒiij.
Aquæ Menth. Pip., ad ℥viij.
Misce.—A sixth part to be taken early in the morning, and repeated as may be necessary.

In dyspeptic and bilious headache with flatulence.

(20) ℞. Quiniæ Disulph., gr. xij.
Acid. Sulph. Dil., ʒss.
T. Ferri Perchlor., ʒij.
Spt. Chloroformi, ʒij.
Magnes. Sulph., ℥jss.
Syr. Zingib., ℥j.
Aquæ, ad ℥xij.
Misce.—Two tablespoonfuls three times a day.

In neuralgic headache with constipation.

(21) ℞. Syr. Ferri Phosph. et Quiniæ et Strychniæ, ℥jss.
Misce.—A teaspoonful in a wineglassful of water three times a day after food.

In neuralgic and nervous headache.

(22) ℞. Syr. Ferri Hypophos., ℥jss.
Misce.—A teaspoonful in a wineglassful of water three times a day after food.

In neuralgic and nervous headache, where the hypophosphites are useful, and in some congestive headaches.

(22 *a*) ℞. Syr. Ferri et Calcii Lactophosph., ℥ij.
Misce.—One or two teaspoonfuls in a wineglassful of water twice a day after food. Fifteen or twenty grains of bromide of potassium or ammonium may sometimes be added to each dose.

In similar cases to the preceding marked by general debility and defective nutrition.

(23) ℞. Calcis Hypophos., gr. lxxx.
Tinct. Ferri Perchl., ʒiij.
Quiniæ Disulph., gr. xvj.
Strychniæ, gr. ss.–gr. j.
Spt. Chloroformi, ʒij.
Syrupi, ℥jss.
Aquæ puræ, ad ℥viij.
Misce.—A tablespoonful to be taken three times a day in a wineglassful of water.

In similar cases to the above.

(24) ℞. Ferri. Citr. et. Quiniæ, ʒss.
Spt. Chloroformi, ʒj.
Syr. Aurant., ʒiij.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part three times a day after food.

In neuralgic and nervous headache, with anæmia and depression, and in some congestive headaches.*

(24 *a*) ℞. Liquor. Ferri Dialysati, ℥j.
Misce.—Ten to thirty minims in a wineglassful of water twice or three times a day.

In similar cases to the preceding, and especially in the anæmic headache of children.

(24 *b*) ℞. Ferri Amm. Citr., ℈ij.
Liq. Potass. Ars., ♏xl.
Syr. Zingib., ʒss.
Inf. Calumbæ, ad ℥viij.
Misce.—Two tablespoonfuls twice a day after food.

In nervous and neuralgic headache with anæmia.

(25) ℞. Amm. Bromid., ʒj.
Spt. Amm. Arom., ʒss.
Aquæ puræ, ad ℥jss.
Misce.—To be taken on rising in the early morning.

In some forms of nervous and congestive headache.

(25 *a*) ℞. Potass. Bromid., ʒj.
Spt. Amm. Arom., ʒij.
Amm. Carb.,
Sodæ Bicarb., āā ℈ij.
Syr. Aurant., ʒiij.
Aquæ puræ, ad ℥viij.
Misce.—A sixth part to be taken every four hours whilst effervescing with Acid. Citric., gr. xiv, dissolved in one tablespoonful of water.

In the early stage of nervous and neuralgic headache when there is nausea, and the tongue is coated.

* Three to five drops of the Liquor. Strychniæ, and half an ounce of the Tincture of Calumba, may be sometimes added to this prescription with advantage.

(26) ℞. Potass. Bromid., ʒij.
Spt. Amm. Arom., ʒiij.
Mist. Camph., ad ℥vj.
Misce.—A sixth part three times a day.

In nervous and neuralgic headaches, and where there is excitement and irritability.

(26 *a*) ℞. Tinct. Aconiti, ʒss.
Aquæ puræ, ad ℥iv.
Misce.—A teaspoonful in a tablespoonful of water every half-hour till the pain is relieved.

In acute congestive headache, with flushed face and full pulse.

(27) ℞. Amm. Chlorid., gr. x–℈j.
Aquæ puræ, ad ℥jss.
Misce.—To be taken three times a day.

In neuralgic and nervous headache, where *migraine* and *clavus* are specially marked.

(28) ℞. Sodæ Hypophosphitis, ʒss.
Inf. Calumbæ, ad ℥vj.
Misce.—A sixth part to be taken three times a day.

In neuralgic, nervous, and anæmic headache.

(29) ℞. Magnes. Sulphat., ℥j.
Quiniæ Disulph., gr. viij.
Acid. Sulph. Dil., ♏x.
Inf. Rosæ Co., ad ℥viij.
Misce.—Two tablespoonfuls twice or three times a day after food.

In neuralgic and congestive headache, with constipation and full habit.

(30) ℞. Tinct. Quiniæ, ʒvj.
Spt. Chloroformi, ʒj.
Mist. Camph., ad ℥vj.
Misce.—A sixth part three times a day.

In gouty and nervous headache, where Quinine is necessary.

(31) ℞. Potass. Bicarb.,
Sodæ Bicarb., āā ʒjss.
Vin. Sem. Colch., ʒj–ʒij.
Syr. Zingib., ℥ss.
Aquæ, ad ℥viij.
Misce.—Two tablespoonfuls three times a day, with one tablespoonful of lemon-juice, whilst effervescing.

In gouty headache, and the headache of cerebral hyperæmia.

(32) ℞. Amm. Carb., ʒss.
Vin. Sem. Colch., ʒss.
Tinct. Aurant., ℥ss.
Aquæ, ad ℥jss.
Misce.—A teaspoonful in half a tumberful of Apollinaris or Vichy water three times a day.

In gouty headache.

(33) ℞. Lithiæ Citrat., ℈ij.
Potass. Bicarb., ʒijss.
Tinct. Aurant., ℥ss.
Aquæ, ad ℥iv.
Misce.—A tablespoonful in half a tumblerful of water three times a day.

In gouty headache, where the urine is turbid, or contains lithic acid in excess.

(34) ℞. Potass. Iodidi, ʒss.–ʒj.
Bicarb., ʒij.
Vin. Sem. Colch., ♏xl.
Amm. Carb., gr. xxiv.
Syr. Zingib., ℥ss.
Aquæ, ad ℥viij.
Two tablespoonfuls three times a day.

In rheumatic headache.

(35) ℞. Potass. Iodidi,
Amm. Hydrochlor., āā ʒjss.
Inf. Humuli, ℥vj.
Misce.—A tablespoonful three or four times a day in a wineglassful of water.

In rheumatic headache. (Dr. Smith.)

(36) ℞. Potass. Iodidi, ʒj.
Tinct. Cinch. Co., ℥j.
Colch., ʒj.
Aquæ Cinnamomi, ad ℥xij.
Misce.—Two tablespoonfuls three times a day.

In rheumatic headache.

(37) ℞. Potass. Iodidi, ʒij.
*Liquor. Hydr. Bichlor., ʒvj–℥jss.
Tinct. Gent. Comp., ℥jss.
Aquæ Cinnamomi, ad ℥xij.
Misce.—Two tablespoonfuls three times a day in a wineglassful of water after food.

In syphilitic and organic headache.

(38) ℞. Potass. Iodidi, ʒj.
Liq. Arsenicalis, ʒj.
Tinct. Quiniæ, ad ℥iij.
Misce.—A teaspoonful in a wineglassful of water three times a day after food.

In syphilitic headache.

(39) ℞. Tinct. Ferri Perchlor., ʒijss.
Acid. Sulph. Dil. vel Spt. Chloroformi, ʒj.
Tinct. Lavand. Co., ʒvj.
Syr. Aurant., ℥ss.
Mist. Camph., ad ℥iv.
Misce.—Two teaspoonfuls three times a day in a wineglassful of water.

In nervous headache from menorrhagia.†

* The mercury may be omitted according to circumstances.

† One of the prescriptions containing Arsenic or Ergot may be necessary according to the discretion of the practitioner, or either of these remedies may be added to the Formula.

(40) ℞. Potass. Bromid., ℈j.
Syr. Tolutani, ʒj.
Aquæ, ad ℥jss.
Misce.—To be taken every night at bedtime.

As a sedative in the pain and sleeplessness of nervous and neuralgic headache.

(41) ℞. Acid. Hydrocy. Dil., ʒss.
Aquæ, ad ℥jss.
Misce.—A teaspoonful in a tablespoonful of water every two or three hours.

In the sickness and nausea of nervous headache.

(42) ℞. Acid. Hydrocy. Dil., ♏xxiv.
Potass. Bicarb., ʒj.
Aquæ, ad ℥vj.
Misce.—Take a sixth part, with eight grains of Acid. Citric dissolved in a tablespoonful of water, whilst effervescing.

In similar cases to the preceding, and in the sickness and acidity of dyspeptic headache.

(43) ℞. Spt. Chloroformi, ♏x.
Liquor. Strychniæ, ♏iv.
Decoct. Aloes Comp., ad ℥jss.
Misce.—To be taken early every morning.

In the constipation of nervous headache.

(44) ℞. Acid. Citric, ʒijss.
Quiniæ Dis., gr. xij.
Syr. Aurant., ℥jss.
Aquæ puræ, ad ℥vj.
Misce.

℞. Potass. Bicarb. vel Sodæ Bicarb., ʒiij.
Ammi. Carb., ℈ij.
in pulveres xij.
Signetur.—One powder to be dissolved in a claret-glassful of water, then mixed with a tablespoonful of the mixture, and taken three times a day whilst effervescing.

In some forms of nervous headache where there is nausea and depression.

(45) ℞. Sodæ Bicarb., ʒjss.
Spt. Amm. Arom., ʒij.
Tinct. Gent. Comp., ℥ss.
Syr. Aurant., ℥ss.
Inf. Gent. Co., ad ℥viij.
Misce.—Two tablespoonfuls three times a day.

In nervous headache with dyspepsia, furred tongue, and acidity.

(46) ℞. *Ferri Amm. Citr., ʒss.
Acid. Citric., ʒj.
Quiniæ Sulph., gr. vj.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part to be taken three times a day in effervescence, with Sodæ Bicarb., gr. x, previously dissolved in a tablespoonful of water.

(47) ℞. Acid. Nitric. Dil., ʒj.
Hydrochlor. Dil., ʒij.
Liquor. Strychniæ, ♏xxxvj.
Inf. Quassiæ, ad ℥xij.
Misce.—Two tablespoonfuls three times a day.

In nervous headache with a clean tongue and slow digestion.

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* Three to five minims of the Liquor. Strychniæ may be added in some cases.

(48) ℞. Tinct. Nuc. Vom., ʒj.
Acid. Nitr. Dil., ʒj.
Hydrochl. Dil., ʒij.
Tinct. Aurant., ʒvj.
Aquæ puræ, ad ℥vj.
Misce.—A tablespoonful in a wineglassful of water three times a day.

In nervous headache where the Strychnia does not agree. The Liquor. Strychniæ sometimes causes nervous depression, sickness, and muscular tremors, which I have occasionally noticed as the effect of the Ferri Citr. et Strychniæ in gastralgia.

(49) ℞. Tinct. Digitalis, ʒss.-ʒij.
Mist. Camphoræ, ad ℥vj.
Misce.—A sixth part to be taken three times a day.

In the headache of cerebral anæmia as a cardiac tonic, when the pulse is small and frequent, or there is palpitation.

(50) ℞. Tinct. Digitalis, ʒss.-ʒij.
Spt. Chloroformi, ʒj.
Syr. Aurant. Flor., ʒiij.
Aquæ, ad ℥vj.
Misce.—A sixth part to be taken three times a day.

In the headache of cerebral anæmia, where depression is to be guarded against.

(51) ℞. Inf. Digitalis, ℥vj.
Misce.—Two teaspoonfuls to be taken three times a day.

In similar cases to the preceding, especially if accompanied with dilatation, or fatty change of the heart.

(52) ℞. Tinct. Belladonnæ, ʒij-ʒiij.
Nuc. Vom., ʒj.
Syr. Zingib., ℥ss.
Aquæ, ad ℥vj.
Misce.—A tablespoonful in a wineglassful of water three times a day.

In some forms of anæmic headache.

(53) ℞. Strychniæ Sulph., gr. ss.
Tinct. Ferri Chlorid., ʒij.
Glycerini, ℥ss.
*Inf. Gent. Comp., ad ℥vj. (Dr. Smith.)
Misce.—A tablespoonful in a wineglassful of water three times a day after meals.

In the headache of cerebral anæmia with nervous exhaustion.

(54) ℞. Amm. Carb., ʒss.
Tinct. Calumbæ,
Syr. Aurant., āā ʒiij.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part to be taken twice a day.

In the headache of cerebral softening.

(55) ℞. Amm. Carb., ʒss.
Tinct. Lavand. Comp., ℥ss.
Calumbæ, ʒiij.
Mist. Camph., ad ℥viij.
Misce.—Two tablespoonfuls to be taken three times a day.

In the headache of cerebral softening with irritability and depression, and in some congestive headaches.

(56) ℞. Potass. Bicarb., ʒj.
Iodidi, gr. xviij.
Spt. Amm. Arom., ʒiij.
Mist. Camph., ad ℥viij.
Misce.—A sixth part three times a day after food.

In organic headache due to syphilis.

(57) ℞. Spt. Chloroformi, ♏v.
Liq. Ergot. Ext., ♏xx–ʒss.
Aquæ puræ, ad ℥j.
Misce.—To be taken three times a day.

In the congestive and organic forms of headache in advanced life.

* The infusion of Quassia or Calumba is preferable to Gentian, in consequence of the decomposition of the iron in the latter preparation.

(58) ℞. Liq. Ergot. Ext., ℥iij.
Aquæ, ad ℥vj.
Misce.—Two teaspoonfuls, to be gradually increased to two tablespoonfuls, three times a day.

In congestive headaches from organic disease.

(59) ℞. Sodæ Pot. Tart., ʒij.
Potass. Bicarb., ℈j.
Syr. Aurant., ʒjss.
Aquæ, ad ℥jss.
Misce.—The draught to be taken in effervescence with Acid. Citric, gr. xv, dissolved in a tablespoonful of water, early in the morning.

In dyspeptic and plethoric headache.

(60) ℞. Magnes. Sulph., ʒiij.
Sodæ Bicarb., ʒiij.
Liquor. Taraxaci, ʒvj.
Tinct. Zingib., ʒj.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part to be mixed with Acid. Tart., ℈j, previously dissolved in a tablespoonful of water, and taken early in the morning whilst effervescing.

In dyspeptic and plethoric headaches with sluggish liver.

(61) ℞. Quiniæ Sulph., gr. viij.
Acid. Citric., ʒij.
Aquæ puræ, ad ℥iv.
Misce. Sig.—No. 1 Mistura.

℞. Sodæ Bicarb., ʒiij.
Liquor. Taraxaci,
Syr. Aurant., āā ℥ss.
Aquæ puræ, ad ℥viij.
Misce, Sig.—No. 2 Mistura.
One tablespoonful of No. 1 to be mixed with two tablespoonfuls of No. 2, and taken whilst effervescing three times a day.

In similar cases to the above, where Quinine is admissible.

(62) ℞. Tinct. Cinch. Comp., ℥j.
Spt. Amm. Arom., ℥ss.
Misce.—A teaspoonful in a wineglassful of water three times a day.

In some passive congestive headaches, where a tonic and stimulant are required.

(63) ℞. Potass. Bromid., ʒss.
Tinct. Cannabis Ind.,
Hyoscyami, āā ʒss.
Aquæ puræ, ad ℥j. (Clouston.)
Misce.—To be taken at bedtime.

In the sleeplessness of hyperæmic headache.

(64) ℞. Tinct. Cannabis Ind., ♏x.
Potass. Bromid., ℈j.
Aquæ puræ, ad ℥jss.
Misce.—To be taken at bedtime.

In the sleeplessness of hyperæmic headache.

(65) ℞. Tinct. Hyoscyami, ʒss.
Mist. Camph., ad ℥j.
Misce.—To be taken every night at bedtime.

In the sleeplessness of nervous and hyperæmic headache.

(66) ℞. Hydrat. Chloral., ℈j.
Aquæ puræ, ad ℥jss.
Misce.—To be taken at bedtime.

In the headache of cerebral hyperæmia and vascular excitement.

(67) ℞. Hydrat. Chloral.,
Potass. Bromid., āā gr. x.
Syr. Rhœados, ℥j.
Aquæ puræ, ad ℥jss.
Misce.—To be taken at bedtime.

In the headache of cerebral hyperæmia and nervo-hyperæmic headache with nervous excitement.

(68) ℞. Potass. Bromid., ʒij.
Syr. Aurant., ℥ss.
Inf. Gent. Comp., ℥iv.
Aquæ puræ, ad ℥vj.
Misce.—A sixth part to be taken three times a day.

In nervo-hyperæmic headache with loss of appetite and debility.

(69) ℞. Potass. Bromid.
vel Hydr. Chloral., gr. x.
Nepenthe, ♏x.
Aquæ puræ, ad ℥jss.
Misce.—To be taken at bedtime.

In the sleeplessness of nervo-hyperæmic headache.

(70) ℞. Syr. Hydrat. Chloral., ℥jss.
Misce.—One teaspoonful in a wineglassful of water in the nervo-hyperæmic form of headache at bedtime, or in the daytime, when the pain is severe, till sleep comes on.

(71) ℞. Ferri Amm. Citr., ʒj.
Potass. Bromid., ʒiij.
vel Amm. Bromid., ʒiij.
Syr. Zingib., ℥ss.
Aquæ puræ, ad ℥vj.
Misce.—A tablespoonful in a wineglassful of water twice a day, at 11 A.M. and 4 P.M.

In the headache of cerebral anæmia.

(72) ℞. Potass. Bromid., ℈j.
vel Amm. Bromid., ℈j.
Tinct. Valerian. Co., ʒj.
Syr. Aurant. Flor., ʒj.
Aquæ Cinnamomi, ad ℥jss.
Misce.—To be taken twice or three times a day.

In some forms of neuralgic headache.

(73) ℞. Pulv. Ipecac. Comp., gr. x–gr. xv.
Fiat pulvis.—To be taken at bedtime in gruel.

In rheumatic headache.

(76) ℞. Ferri Sulphat.,
Pulv. Zingib., āā gr. vj.
Ext. Aloes Aquos,
Quiniæ Sulph.,
Saponis, āā gr. xij.
Misce et divide in pilulas xij.—One to be taken twice a day after food.

In the headaches of cerebral anæmia and neuralgia, where the bowels are sluggish.

(77) ℞. Ext. Aloes Barb., gr. ¼.
Pulv. Ipecac., gr. j.
Pil. Rhei Comp., gr. iij.
Misce et fiat pilula.—To be taken daily before dinner.

In the headache of cerebral anæmia and dyspeptic headache, where intestinal action is sluggish.

(78) ℞. Quiniæ Sulph.,
Ext. Aloes Aquos, āā gr. xij.
Pulv. Capsici,
Ipecac., āā gr. vj.
Glycerini, q. s.
Ut fiant pilulæ xij.—One to be taken daily before food, at midday.

In similar cases to the preceding, and especially in women with small assimilative power.

Vel. ℞. Ext. Nuc. Vom., gr. ss.
Pil. Rhei Comp., gr. iij.
Pulv. Capsici, gr. ½.
Misce et fiat pilula.—To be taken daily at 12 o'clock. (Samaritan Hospital.)

An excellent pill to keep the bowels regular in nervous headache, where the muscular fibre of the intestines requires stimulation.

(79) ℞. Hydr. Subchlorid., gr. iij.
Pil. Coloc. Co., gr. vj.
Ext. Hyoscyami, gr. ij.
Misce et divide in pilulas ij.—To be taken at bedtime occasionally.

As a cholagogue cathartic in dyspeptic, bilious, and gouty headache.

(80) ℞. Pulv. Scammonii, ℈j.
Ext. Coloc. Co., ʒj.
Hydr. Subchlorid., gr. xij.
Ol. Carui, ♏x.
Misce et divide in pilulas xviij.—One or two occasionally at bedtime, in similar cases to the preceding.

(81) ℞. Pil. Hydrarg., gr. xij.
Rhei Comp., ʒss.
Ext. Hyoscyami, gr. x.
Misce et divide in pilulas xij.—One or two at bedtime twice a week.

In dyspeptic headache, and in the headaches of advanced life with a sluggish liver.

(82) ℞. Hyd. c̄. Cretâ, gr. xij.
Ext. Hyoscyami, gr. x.
Pil. Rhei Comp., ℈ij.
Misce et divide in pilulas xij.—One or two occasionally at bedtime.

As an alterative in dyspeptic headache.

(83) ℞. Ferri Sulphat.,
Quiniæ Sulph., āā gr. xij.
Pulv. Rhei, gr. ix.
Zingib., gr. vj.
Misce et divide in pilulas xij.—Take one three times a day.

In neuralgic headache and atonic dyspepsia with flatulence.

(84) ℞. Pil. Aloes et Asafœtid., ʒj.
In pilulas xij.—One or two at bedtime every night.
In nervous headache with flatulence and constipation.

(85) ℞. Pil. Aloes et Ferri, ʒj.
In pilulas xij.—One or two at bedtime every night.
In neuralgic and nervous headache with constipation.

(86) ℞. Pil. Aloes et Myrrhæ, ʒj.
Ferri Sulphat., gr. vj.
Misce et divide in pilulas xij.—Two occasionally at bedtime.
In nervous or anæmic headache with torpid colon.

(87) ℞. Zinci Valerian., gr. xij.
Pulv. Rhei, gr. xx.
Zingib., gr. vj.
Ext. Gentian, gr. xij.
Misce et divide in pilulas xij.—One to be taken three times a day.
In neuralgic headache.

(88) ℞. Phosph. Pur.,
Strychniæ, āā gr. j.
Conf. Rosæ, q. s.
Ut fiant pilulæ l.—Take one three times a day.
In some forms of neuralgic headache.

(89) ℞. Phosph. Pur., gr. j.
Conf. Rosæ, q. s.
Ut fiant pilulæ xxxvj.—Take one three times a day.
In similar cases to the preceding,*

* Perles of Phosphorus are manufactured by Messrs. Corbyn, Stacey & Co., each Perle containing gr. $\frac{1}{30}$, gr. $\frac{1}{60}$, gr. $\frac{1}{100}$. They are hermetically closed in a covering of gelatin, and the dose and effect of the remedy may be relied upon. When Phospborus is prescribed alone, the Perle is the best method of administering it.

(90) ℞. Phosph. Pur., gr. ¼.
Ferri Redact., gr. xx.
Ext. Nuc. Vom., gr. ij.
Misce et divide in pilulas viij.—One to be taken twice a day.

In neuralgic headache.*

(91) ℞. Phosph. Pur., gr. j.
Quiniæ Sulph.,
Ferri Sulph., āā gr. xvj.
Ext. Rhei, ℈j.
In pilulas xxxvj.—One to be taken three times a day.

(92) ℞. Ext. Cannabis Ind., gr. ¼–gr. j.
Conf. Rosæ, q. s.
Ut fiat pilula.—To be taken at bedtime.

In the sleeplessness of neuralgic headache.

(93) ℞. Pulv. Camphor., gr. ij.
Ext. Hyoscyami, gr. ij.
Misce et fiat pilula.—To be taken at bedtime.

In the sleeplessness of nervous and neuralgic headache.

(94) ℞. Podophyllin, gr. iv.
Pil. Hydrarg, gr. viij.
Ext. Hyoscyami, gr. xvj.
Misce et divide in pilulas viij.—Take one every night.

In gouty headache.

(95) ℞. Pil. Coloc. c̄ Hyos., ℥j.
In pilulas xij.—One or two at bedtime occasionally.

In nervous headache, when an active aperient is required.

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* These prescriptions may be varied according to the state of the patient; Valerianate of Zinc and Cannabis Indica may sometimes be added.

(96) ℞. Ext. Colocynth., ℈ij.
Rhei,
Pulv. Scammonii, āā gr. x.
In pilulas xij.—Take one occasionally at bedtime.

In nervous or dyspeptic headache as an active aperient.

(97) ℞. Zinci Valerian.,
Ferri Sulph.,
Ext. Rhei, āā gr. xvj.
Misce et divide in pilulas xvj.—One to be taken three times a day.

In nervous headache.

(97*a*) ℞. Zinci Sulph., gr. j.
Ext. Nuc. Vom., gr. ss.
Conf. Rosæ, q. s.
Ut fiat pilula.—To be taken twice a day.

In nervous headache.

(98) ℞. Zinci Oxyd., gr. ij.
Conf. Rosæ, q. s.
Ut fiat pilula.—To be taken three times a day.

In nervous headache.

(99) ℞. Pil. Rhei Comp., ℥j.
In pilulas xij.—Take one every night.

As a mild aperient in nervous and dyspeptic headache.

(100) ℞. Pulv. Ipecac., gr. vj.
Ext. Aloes Barb., gr. xij.
Taraxaci, ℥ss.
Saponis, gr. x.
Misce et divide in pilulas xij.—Take one every night, or before dinner daily.

As a laxative in nervous headache to assist digestion.

(101) ℞. Pulv. Myrrhæ,
Rhei, āā gr. xvj.
Pil. Aloes Barb., gr. xij.
Ext. Anthemidis, ʒss.
Ol. Caryophylli, ♏v.
Misce et divide in pilulas xx.—One or two daily before the midday meal.

As a dinner pill in nervous and dyspeptic headache to assist digestion.

(102) ℞. Ext. Opii,
Pulv. Rhei, āā gr. j.
Pil. Coloc. Co., gr. jss.
Misce et fiat pilula.—To be taken every night.

In the sleeplessness of anæmic headache.

(103) ℞. Ext. Gentian.,
Ferri Sulph.,
Pulv. Digitalis, āā gr. xij.
Cinnamomi, gr. vj.
Misce et divide in pilulas xij.—Take one three times a day.

In the headache of cerebral anæmia, where Digitalis is required. Where there is unsteadiness of the heart's action after food, and there is flatulence, the iron may be advantageously omitted, and Pulv. Zingib. substituted for Pulv. Cinnamomi.

(104) ℞. Ext. Belladonnæ, gr. vj–gr. xij.
Glycyrrhizæ, gr. xxiv.
Misce et divide in pilulas xij.—Take one every night, or night and morning, but the remedy must be carefully watched.*

In the headache of cerebral anæmia.

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* See the effects of an overdose in Chapter I, on the Headache of Cerebral Anæmia.

(105) ℞. Zinci Valerian, gr. viij.
Ext. Humuli, gr. xx.
Rhei, gr. viij.
Misce et divide in pilulas viij.—Take one every night.

In some forms of organic headache and cerebral softening, where there is irritability and sleeplessness.

(106) ℞. Ext. Aconiti, gr. vj.
Hyoscyami, gr. xviij.
Ant. Pot. Tart., gr. j.
Misce et divide in pilulas vj.—Take one every night.

In the headache of active cerebral hyperæmia, where depressants are required.

(107) ℞. Bismuth. Subcarb., ℈j.
To be taken in a wineglassful of water twice a day before meals.

In subacute congestive headache, with flatulence and discomfort after food.

(108) ℞. Zinci Sulph.,
Aquæ puræ, ℥jss.
Fiat haustus.—To be taken as an emetic, followed by drinking freely of warm water till vomiting ensues.

In some forms of bilious and nervous headache.

(109) ℞. Pulv. Ipecac., ℈j.
Aquæ puræ, ℥jss.
Fiat haustus.

In the same cases as the preceding.

(110) ℞. Ext. Belladonnæ, gr. v.
To be rubbed into the affected temple every night.

In nervous headache, migraine, clavus, etc.

(111) ℞. Ung. Veratriæ, ʒj. (B. P.)
A little to be rubbed into the affected temple till the pain is relieved.

In neuralgic and some forms of nervous headache, where the pain is localized.

(112) ℞. Ung. Aconitiæ, ʒj. (B. P.)
To be used in the same way, and for the same cases as the preceding.
Ung. Aconitinæ (Fleming).

(113) ℞. Aconitinæ, gr. xvj,
Spt. Vini Rect., ♏xvj.
Rub together, and then add carefully one ounce of lard. It may be used in the same cases as the preceding. (*A very expensive application.*)

(114) ℞. Ext. Aconiti Alcohol., ʒj.
Adipis, ʒij.
Misce et fiat unguentum.—To be used in the same cases as the preceding. (*Much less expensive.*)*

(114 *a*) ℞. Ung. Hyd. Nit. Oxyd., ʒjss.
Adipis Benz., ʒijss.
Misce.—A piece the size of a small nut to be rubbed into the scalp night and morning.
In pityriasis of the scalp.

(115) ℞. Quiniæ Sulph., gr. x.
Acid. Sulph. Dil., ♏x.
Aquæ, ad ♏c.
Misce.—To be injected in severe cases.†

(Surgeon-Major A. R. Hall's formula for the subcutaneous injection of Quinine in the hyperpyrexia of sunstroke.)

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* In using all these ointments care is required to apply very small quantities, and never to the broken skin. A tingling sensation commonly precedes the cessation of the pain.

† The acid in this gives rise to pain and inflammation, sometimes even to a troublesome boil or abscess. The neutral sulphate is soluble without acid, and does not produce local irritation.

(116) ℞. Morph. Acet., gr. x.
Atropiæ Sulph., gr. j.
Aquæ destill., ʒij.
Misce.

Formula for the hypodermic injection of Morphia. Twelve minims contain one grain of Morphia.

Many of the preceding Formulæ are suitable for children in diminished doses proportioned to age.

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